Vol. 1032 Number 1

# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

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# OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

July 5, 1983 Volume 1032 Number 1


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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.

GENERAL INFORMATION concerning PATENTS.

GENERAL INFORMATION concerning TRADEMARKS.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.00 each; PLANT PATENTS in color, $8.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

# PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty Information

For information concerning the PCT member countries see the notice appearing in the Official Gazette at 1017 O.G. 10 on Apr. 13, 1982. For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States, see the notice in the Official Gazette of Sept. 28, 1982 at 1022 O.G. 52.

Note that the domestic PCT fees have been increased as of Oct. 1, 1982 by a rule change to 37 CFR 1.445 that was published at 1021 O.G. 11 on Aug. 10, 1982. Also note that the international PCT fees have changed as of Jan. 1, 1983 and the Search Fee for the European Patent Office as Searching Authority changed as of Jan. 22, 1983. The notice regarding the change in international fees and the Search Fee for the European Patent Office appeared at 1025 O.G. 27, on 28 Dec. 1982. The current schedule of fees is as follows:

| | |
|---|---|
| Transmittal fee | $ 125.00 |
| Search fee | |
| U.S. Patent and Trademark Office as Searching Authority | |
| · No corresponding prior U.S. national application filed | 500.00 |
| · Corresponding prior U.S. national application filed | 250.00 |
| European Patent Office as Searching Authority | |
| · All cases | 670.00 |
| International Fees | |
| Basic Fees (first 30 pages) | 265.00 |
| Basic Supplemental Fee (for each page over 30) | 5.00 |
| Designation fee (for each national or regional office) | 65.00 |

GERALD J. MOSSINGHOFF,
Dec. 3, 1982. *Commissioner of Patents and Trademarks.*

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### REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**3,588,917,** Re. S.N. 491,552, Filed May 4, 1983, Cl. 2/161, GOLF GLOVE, Anthony John Antonious, Owner of Record: *Inventor,* Attorney or Agent: Eugene L. Bernard, et al., Ex. Gp.: 353

**3,645,835,** Re. S.N. 494,013, Filed May 12, 1983, Cl. 428/146, MOISTURE-VAPOR-PERMEABLE PRESSURE SENSITIVE ADHESIVE MATERIALS, Martin E. Hodgson, Owner of Record: *T. J. Smith & Nephew Ltd., Yorkshire, England,* Attorney or Agent: Albert L. Jacobs, Jr., Ex. Gp.: 164

**3,878,876,** Re. S.N. 486,027, Filed Apr. 18, 1983, Cl. 145/32R, MULTI-PURPOSE SAW BLADE SUSPENSION ARRANGEMENT FOR RECIPROCATING SAWS, Helmut Abel, Owner of Record: *Inventor,* Attorney or Agent: Costas S. Krikelis, Ex. Gp.: 323

**3,975,761,** Re. S.N. 487,089, Filed Apr. 21, 1983, Cl. 358/78, METHOD AND ARRANGEMENT FOR THE AVOIDANCE OF ERRORS DURING THE REPRODUCTION OF AN IMAGE PATTERN, Heinz Taudt, et al., Owner of Record: *Ing. Rudolf Hell GmbH., Kiel, Germany,* Attorney or Agent: James Van Santen, et al., Ex. Gp.: 233

**4,119,754** Re. S.N. 485,508, Filed Apr. 15, 1983, Cl. 162/000.000, PAPERMAKERS FABRICS, Bryan J. Gisbourne, Owner of Record: *Scapa-Porritt Ltd., Lancashire, England,* Attorney or Agent: Martin Fleit, et al., Ex. Gp.: 173

**4,135,213,** Re. S.N. 492,037, Filed May 5, 1983, Cl. 358/142, ROW GRABBING VIDEO DISPLAY TERMINAL HAVING LOCAL PROGRAMMABLE CONTROL THEREOF, Leonard Wintfeld, et al., Owner of Record: *IDR, Inc., Farmingdale, N.Y.,* Attorney or Agent: Lawrence G. Kurland, et al., Ex. Gp.: 233

**4,256,945,** Re. S.N. 474,096, Filed Mar. 10, 1983, Cl. 219/10.75, ALTERNATING CURRENT ELECTRICALLY RESISTIVE HEATING ELEMENT HAVING INTRINSIC TEMPERATURE CONTROL, Philip S. Carter, et al., Owner of Record: *Oximetrix, Inc., Mountain View, Calif.,* Attorney or Agent: William D. Hall, et al., Ex. Gp.: 213

**4,265,193,** Re. S.N. 491,937, Filed May 5, 1983, Cl. 114/267, CONCRETE MARINE FLOAT AND METHOD OF FABRICATING, Wesley W. Sluys, Owner of Record: *Builders Concrete, Inc., Billingham, Wash.,* Attorney or Agent: Richard W. Seed, et al., Ex. Gp.: 315

**4,266,668,** Re. S.N. 493,564, Filed May 11, 1983, Cl. 206/557, TELESCOPING SLICED BREAD DISPENSER, Yong K. Paek, Owner of Record: *Inventor,* Attorney or Agent: Harold L. Stowell, et al., Ex. Gp.: 241

**4,290,304,** Re. S.N. 493,976, Filed May 12, 1983, Cl. 73/862.25, BACK-UP POWER TONGS AND METHOD, Emery L. Eckel, Owner of Record: *Eckel Manufacturing Co., Odessa, Tex.,* Attorney or Agent: Robert M. Carwell, et al., Ex. Gp.: 244

**4,290,816,** Re. S.N. 492,183, Filed May 6, 1983, Cl. 106/287.32, SULFUR COMPOUNDS AND METHOD OF MAKING SAME, Allen C. Ludwig, et al., Owner of Record: *Southwest Research Institute, San Antonio, Tex.,* Attorney or Agent: W. F.Hyer, Ex. Gp.: 142

**4,306,034,** Re. S.N. 487,365, Filed Apr. 21, 1983, Cl. 521/139.000, COMPOSITION FOR PRODUCING ARTICLE SIMULATING PLANTATION CREPE RUBBER, Agmund K. Thorsrud, Owner of Record: *Phillips Petroleum Co., Bartlesville, Okla.,* Attorney or Agent: Louis N. French, et al., Ex. Gp.: 143

**4,319,214,** Re. S.N. 485,261, Filed Apr. 15, 1983, Cl. 337/343, CREEPLESS, SNAP ACTION THERMOSTAT, Omar Givler, Owner of Record: *Portage Electric Products, Inc., North Canton, Ohio,* Attorney or Agent: Lloyd McAulay, et al., Ex. Gp.: 212

**4,364,292,** Re. S.N. 491,758, Filed May 5, 1983, Cl. 83/605, FLOOR OR BENCH MOUNTED CONDUIT CUTTING DEVICE, Glenn A. Wozniak, et al., Owner of Record: *Indian Head Inc., New York, N.Y.,* Attorney or Agent: William R. Laney, et al., Ex. Gp.: 324

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### Erratum

In the Official Gazette of Feb. 15, 1983, an incorrect patent number, 4,306,624, appears in the following listing under "REISSUE APPLICATIONS FILED":

4,306,624, Re. S.N. 442,913, Filed Nov. 19, 1982, Cl. 198/341, CONVEYOR APPARATUS, Antonio

Magni, Owner of Record: AXIS, S.p.A., Firenze, Italy, Attorney or Agent: Lawrence I. Lerner, Ex. Gp.: 313.

The listing should read as follows:

4,306,646, Re. S.N. 442,913, Filed Nov. 19, 1982, Cl. 198/341, CONVEYOR APPARATUS, Antonio Magni, Owner of Record: AXIS, S.p.A., Firenze, Italy, Attorney or Agent: Lawrence I. Lerner, Ex. Gp.: 313.

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## REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.21(b)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**3,732,068,** Reexam. No. 90/000,382, Requested: May 16, 1983, Cl. 432/120, CYLINDRICAL ELONGATED FURNACE FOR TREATING MATERIAL AT HIGH TEMPERATURE AND UNDER HIGH PRESSURE, Hans Larker, Owner of Record: *Alimanna Svenska Flektriska Aktiebolaget, Vasteras, Sweden,* Attorney or Agent: None, Ex. Gp.: 344, Requester: Stanley P. Fisher, et al., Arlington, Va.

**3,932,044,** Reexam. No. 90/000,385, Requested: June 1, 1983, Cl. 401/265, PEN POINT FOR WRITING INSTRUMENTS, Nobuyuki Otake, et al., Owner of Record: *Requester,* Attorney or Agent: Parkhurst & Oliff, Ex. Gp.: 336, Requester: Tokyo Boski K. K., Tokyo, Japan

**4,038,498,** Reexam. No. 90/000,384, Requested: May 26, 1983, Cl. 179/18PC, CENTRAL OFFICE SWITCHING SYSTEM WITH REMOTE LINE SWITCH, Frank S. Boxall, Owner of Record: *Inventor,* Attorney or Agent: Flehr, Hohbach, et al., Ex. Gp.: 214 Requester: Inventor

**4,379,168,** Reexam. No. 90/000,387, Requested: May 27, 1983, Cl. 424/356, PESTICIDES CONTAINING D-LIMONENE, Vincent Dotolo, Owner of Record: *Inventor,* Attorney or Agent: James C. Wray, Ex. Gp.: 125 Requester: Roger L. Browdy, Washington, D.C.

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## COMMISSIONER ORDERED REEXAMINATIONS

Notice under 37 CFR 1.11(c). The orders for reexamination listed below are open to inspection by the general public in the indicated Examining Group. Copies of the Orders and other related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.21(b)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed. 37 CFR 1.248(a)(5) and 1.525(b).

**4,338,751,** Reexam. No. 90/000,394, Ordered: June 10, 1983, Cl. 52/187 KNOCKDOWN SPIRAL STAIRWAY, Forest E. Sanders, Owner of Record: *Inventor,* Attorney or Agent: Morton S. Adler, Ex. Gp.: 354.

**4,338,757,** Reexam. No. 90/000,393, Ordered: June 10, 1983, Cl. 52/699, DEVICE FOR CONNECTING A STRUCTURE WITH A WALL TO BE POURED WITH CONCRETE, Heinz Witschi, et al., Owner of Record: *Inventors,* Attorney or Agent: Wigman & Cohen, Ex. Gp.: 354.

**4,343,124,** Reexam. No. 90/000,392, Ordered: June 10, 1983, Cl. 52/226, STRUCTURAL ELEMENTS, Friedrich C. Math, Owner of Record: *British Petroleum Co., Ltd., London, England,* Attorney or Agent: Morgan, Finnegan, et al., Ex. Gp.: 354.

## Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their legal assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

New World Communications, Inc., Indianapolis, Ind., Reg. No. 1,060,995, for the mark "NEW WORLD", Canc. No. 13,459.

Insight Dynamics Corp., New York, N.Y., Reg. No. 1,136,437, for the mark "INSIGHT DYNAMICS", Canc. No. 13,471.

Topper Corp., assignee, by assignment and change of name, of De Luxe Reading Corp., Elizabeth, N.J., Reg. No. 766,656, for the mark "CANDY FASHION", Canc. No. 13,490.

The Thomas Holmes Corp., assignee by mesne assignment of Sulray, Inc., Philadelphia, Pa., Reg. No. 770,851, for the mark "SPANETTE", Canc. No. 13,548.

Pro-Am Skateboard Products, Inc., Downey, Calif., Reg. No. 1,100,891, for the mark "PURE GOLD", Canc. No. 13,603.

Mid-Tec, Inc., St. Charles, Mo., Reg. No. 923,403, for the mark "CELL-TEC", Canc. No. 13,611.

Tri-R Chemicals, Inc., Boca Raton, Fla., Reg. No. 1,066,008, for the mark "BOND-CRAFT", Canc. No. 13,623.

Newporter Industries, Inc., Irvine, Calif., Reg. No. 1,100,281, for the mark "PIPELINE", Canc. No. 13,629.

Dent-U-Sonic Corp., North Miami Beach, Fla., Reg. No. 887,562, for the mark "DENT U SONIC", Canc. No. 13,658.

Don Heyer, Anaheim, Calif., Reg. No. 404,741, for the mark "VARIGEAR", Canc. No. 13,674.

Legi Electronics Corp., assignee of Ishimoto Trading Co., Gardena, Calif., Reg. No. 865,664, for the mark "ITRON", Canc. No. 13,675.

Joseph A. McCollum, Inc., assignee of R. M. Hollingshead Corp., Marlton, N.J., Reg. No. 443,509, for the mark "COCOON", Canc. No. 13,700.

Whitney Paige Cosmetics, Ltd., Mount Vernon, N.Y., Reg. No. 1,106,954, for the mark "EMOLLIENCE P.M.", Canc. No. 13,723.

ERMA S. BROWN,
*Deputy Clerk of the Trademark Trial and Appeal Board.*
For MARGARET M. LAURENCE,
*Assistant Commissioner for Trademarks.*

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## Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of default of such proceedings sent to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its legal assign or legal representative, shall enter an appearance within thirty days from the date of this publication, judgment will be entered against registrant and said registration will be cancelled.

Drossler and Associates, Inc., assignee of Ceco Marketing Consulting & Research, Inc., San Francisco, Calif., Reg. No. 853,394, for the mark "COMPASS", Canc. No. 13,469.

ERMA S. BROWN,
*Deputy Clerk of the Trademark Trial and Appeal Board.*
For MARGARET M. LAURENCE,
*Assistant Commissioner for Trademarks.*

## National Technical Information Service

### U.S. GOVERNMENT-OWNED INVENTIONS

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The inventions listed below are owned by agencies of the U.S. Government and are available for licensing in the U.S. in accordance with 35 U.S.C. 207 to achieve expeditious commercialization of results of federally funded research and development. Foreign patents are filed on selected inventions to extend market coverage for U.S. companies and may also be available for licensing.

Technical and licensing information on specific inventions may be obtained by writing to:

Office of Government Inventions and Patents
U.S. Department of Commerce
P.O. Box 1423
Springfield, Va. 22151

Please cite the number and title of inventions of interest.

GEORGE KUDRAVETZ,
*Program Manager,*
Office of Government Inventions and Patents
National Technical Information Service
U.S. Department of Commerce.

#### DEPARTMENT OF THE AIR FORCE

SN 6-169,231 (4,377,755). SIGNAL COMPRESSOR APPARATUS.

SN 6-191,044 (4,375,597). METHOD OF IMPLEMENTING UNIFORM BACKGROUND CHARGE SUBTRACTION IN A RADIATION SENSING ARRAY.

SN 6-222,845 (4,380,763). CORROSION MONITORING SYSTEM.

SN 6-227,558 (4,381,450). PULSED RADIATION DOSIMETRY APPARATUS.

SN 6-237,020 (4,381,509). CYLINDRICAL MICROWAVE LENS ANTENNA FOR WIDEBAND SCANNING APPLICATIONS.

SN 6-242,816 (4,377,341). SYSTEM FOR MEASURING ANGULAR DEVIATION IN A TRANSPARENCY.

SN 6-251,696 (4,377,824). MULTI-CHANNEL LONGITUDINAL VIDEO TAPE RECORDING.

SN 6-291,891 (4,377,546). PROCESS FOR PRODUCING AROMATIC HETEROCYCLIC POLYMER ALLOYS.

SN 6-313,859 (4,377,641). METHOD AND APPARATUS FOR THE CONTINUOUS EXTRACTION OF INGREDIENTS FROM SAMPLES.

SN 6-366,744 (4,380,619). OXY-AND THIOARYLPHENYLATED AROMATIC HETEROCYCLIC POLYMERS.

SN 6-368,784 (4,377,291). SEALING ASSEMBLY.

SN 6-435,522. IMAGING APPARATUS FOR TRANSVERSE ELECTRODE ELECTRO-OPTIC TUNABLE FILTER.

SN 6-441,815. OPTICAL ALIGNMENT DEVICE FOR BINOCULAR DISPLAYS.

SN 6-444,004. LIFTOFF SUPPRESSION APPARATUS FOR THE FERROMAGNETIC RESONANCE PROBE.

SN 6-447,599. SCHOTTKY BARRIER INFRARED DETECTOR AND PROCESS.

SN 6-468,781. A METHOD FOR THE PREPARATION OF EPITAXIAL FILMS OF MERCURY CADMIUM TELLURIDE.

SN 6-470,749. VERTICAL LAUNCH ALIGNMENT TRANSFER APPARATUS.

SN 6-471,078. ECCENTRICALLY TIGHTENED LATCH DEVICE.

SN 6-475,417. STORAGE CABINET TRAVEL LOCK.

SN 6-475,436. A SCANNING SYSTEM FOR MAPPING GAS FLOW UNIFORMITY IN A LAZER.

SN 6-475,664. PNEUMATIC CLAMPING DEVICE.

SN 6-475,665. LATERAL SUPPORT SYSTEM FOR CANISTER-LAUNCHED MISSILE.

SN 6-475,669. AUGMENTOR FUEL SPRAYING WITH DRAIN VENT.

SN 6-477,793. IMPROVED TITANIUM METAL-MATRIX COMPOSITES.

SN 6-477,998. MULTI-MICROPROCESSOR APPARATUS.

SN 6-478,581. SYNTHESIS OF PENTAFLUOROTELLURIUM HYPOFLUORITE.

SN 6-479,221. HYPERPRODUCING CELLULASE MICROORGANISM.

SN 6-480,156. INTERFACE ALIGNMENT SYSTEM.

SN 6-480,170. TWO FAULT TOLERANT TRANSMITTER ACTIVATOR.

SN 6-484,329. FLAMEHOLDER WITH INTEGRATED AIR MIXER.

SN 6-484,390. STRUTLESS DIFFUSER FOR GAS TURBINE ENGINE.

SN 6-488,887 (4,376,716). PREPARATION OF STABLE SODIUM CARBONATE DISPERSIONS.

#### ENIVRONMENTAL PROTECTION AGENCY

SN 6-213,799 (4,381,681). PARTICULATE SAMPLE COLLECTOR.

#### DEPARTMENT OF HEALTH AND HUMAN SERVICES

SN 6-476,830. A PRACTICAL TOTAL SYNTHESIS UNNATURAL ENANTIOMERS OF OPIUM-DERIVED MORPHINANS.

#### DEPARTMENT OF THE INTERIOR

SN 6-363,367 (4,381,287). SEPARATION OF ZIRCONIUM AND URANIUM.

SN 6-460,102. RECOVERY OF METALS FROM GRINDING SLUDGES.

#### TENNESSEE VALLEY AUTHORITY

SN 6-164,418 (4,379,939). PREPARATION OF NITROGEN .ERTILIZERS FROM OXALATE ESTERS PREPARED BY THE OXIDATIVE CARBONYLATION OF ALCOHOLS OVER NOBEL METAL CATALYSTS UTILIZING REGENERABLE 2,5-CYCLOHEXADIENE-1,4-DIONE OXIDANTS.

SN 6-336,662 (4,377,406). AMMONIUM POLYPHOSPHATE SULFATE FERTILIZERS FROM WET-PROCESS PHOSPHORIC ACID.

# PATENT NOTICES

**Certificates of Correction for the Week of July 5, 1983**

| | | | |
|---|---|---|---|
| Re. 31,177 | 4,331,175 | 4,368,199 | 4,374,992 |
| 3,920,278 | 4,342,161 | 4,368,233 | 4,375,057 |
| 4,012,326 | 4,343,902 | 4,368,247 | 4,375,136 |
| 4,045,563 | 4,344,356 | 4,368,533 | 4,375,256 |
| 4,108,366 | 4,344,539 | 4,369,105 | 4,376,030 |
| 4,150,779 | 4,345,302 | 4,369,280 | 4,376,100 |
| 4,151,645 | 4,345,855 | 4,369,444 | 4,376,250 |
| 4,184,203 | 4,347,678 | 4,369,522 | 4,376,322 |
| 4,192,935 | 4,349,848 | 4,370,114 | 4,376,769 |
| 4,213,987 | 4,350,975 | 4,370,193 | 4,376,800 |
| 4,233,080 | 4,351,977 | 4,370,328 | 4,376,834 |
| 4,234,493 | 4,353,997 | 4,370,335 | 4,377,072 |
| 4,236,365 | 4,354,497 | 4,370,599 | 4,377,435 |
| 4,249,451 | 4,355,151 | 4,370,614 | 4,377,498 |
| 4,254,793 | 4,359,273 | 4,371,446 | 4,377,572 |
| 4,273,898 | 4,359,304 | 4,371,519 | 4,378,204 |
| 4,276,122 | 4,360,702 | 4,371,823 | 4,378,911 |
| 4,282,867 | 4,362,578 | 4,371,843 | 4,379,607 |
| 4,283,249 | 4,363,835 | 4,371,844 | 4,379,638 |
| 4,287,338 | 4,363,879 | 4,372,143 | 4,380,304 |
| 4,294,309 | 4,365,468 | 4,372,384 | 4,380,625 |
| 4,296,889 | 4,365,546 | 4,372,480 | 4,380,882 |
| 4,298,927 | 4,365,994 | 4,373,208 | 4,381,101 |
| 4,301,052 | 4,366,092 | 4,373,416 | 4,381,255 |
| 4,303,098 | 4,366,162 | 4,374,256 | 4,381,303 |
| 4,304,267 | 4,366,307 | 4,374,296 | 4,381,699 |
| 4,309,304 | 4,367,022 | 4,374,427 | 4,382,244 |
| 4,315,699 | 4,367,444 | 4,374,428 | 4,382,722 |
| 4,322,816 | 4,367,511 | 4,374,490 | 4,383,213 |
| 4,328,013 | 4,367,921 | 4,374,675 | 4,383,219 |

**Disclaimers**

3,898,566.—*Israel Switzer,* North York, Ontario, Canada; *Arie Zimmerman,* Santa Monica; *Lucius T. La Fleur,* Torrance and *Patrick A. Segrave,* Santa Monica, Calif. METHOD AND APPARATUS FOR REDUCING DISTORTION IN MULTICARRIER COMMUNICATION SYSTEMS. Patent dated July 29, 1975. Disclaimer filed May 9, 1983, by the assignee, *Phasecom Corp.*

Hereby enters this disclaimer to claims 1 through 17 and 20 through 27 of said patent.

4,124,834.—*Edward J. Walsh,* Hermitage, Pa. ELECTRICAL INDUCTIVE APPARATUS. Patent dated Nov. 7, 1978. Disclaimer filed Apr. 29, 1983, by the assignee, *Westinghouse Electric Corp.*

Hereby enters this disclaimer to all claims of said patent.

4,162,693.—*John Heller Beckman,* Downers Grove, Ill. REVERSIBLE SHIRRED CASING AND METHOD FOR PRODUCING IT. Patent dated July 31, 1979. Disclaimer filed May 3, 1983, by the assignee, *Union Carbide Corp.*

Hereby enters this disclaimer to the entire term of said patent.

4,320,222.—*John A. Lopez,* Houston, Tex. STORAGE-STABLE PRECATALYZED POLYEPOXIDE COMPOSITIONS. Patent dated Mar. 16, 1982. Disclaimer filed Aug. 23, 1982, by the assignee, *Shell Oil Co.*

Hereby enters this disclaimer to claims 1 to 10, inclusive of said patent.

4,332,320.—*Jeffrey A. Feibelman,* Cranston, R.I. PENDANT DISPLAY CARD. Patent dated June 1, 1982. Disclaimer filed Apr. 28, 1983, by the assignee, *A & H Mfg. Co.*

Hereby enters this disclaimer to the entire remaining term of said patent.

4,366,761.—*Roy T. Card,* Chattanooga, Tenn. DUAL SHIFTABLE NEEDLE BARS FOR TUFTING MACHINE. Patent dated Jan. 4, 1983. Disclaimer filed Apr. 28, 1983, by the asignee, *Tuftco Corp.*

Hereby enters this disclaimer to claims 1–5 and 11 of said patent.

4,376,916.—*John B. Glaberson,* Stamford, Conn. SIGNAL COMPRESSION AND EXPANSION SYSTEM. Patent dated Mar. 15, 1983. Disclaimer filed May 5, 1983, by the assignee, *CBS, Inc.*

Hereby enters this disclaimer to claims 16 and 17 of said patent.

4,383,199.—*Shoichi Washino, Hyogo,* and *Eisho Nosaka,* Kyoto, Japan. ELECTRON GUN. Patent dated May 10, 1983. Disclaimer filed Feb. 25, 1983, by the assignee, *Mitsubishi Denki Kabushiki Kaisha.*

The term of this patent subsequent to Jan. 20, 1998, has been disclaimed.

**Dedication**

3,929,191.—*John Wayne Graham; Thomas Wayne Muecke* and *Claude Everett Cooke, Jr.,* Houston, Tex. METHOD FOR TREATING SUBTERRANEAN FORMATIONS. Patent dated Dec. 30, 1975. Dedication filed Mar. 25, 1983, by the assignee, *Exxon Production Research Co.*

Hereby dedicates to the Public the entire remaining term of said patent.

**Disclaimer and Dedication**

3,265,902.—*Sidney A. Wingate,* Concord, Mass. PHOTOELECTRIC SHAFT ANGLE ENCODER. Patent dated Aug. 9, 1966. Disclaimer and Dedication filed May 2, 1983, by the assignee, *Itek Corp.*

Hereby disclaims and dedicates to the Public the term of the patent subsequent to Mar. 15, 1983.

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# PATENT EXAMINING CORPS

**RENE D. TEGTMEYER, Assistant Commissioner**

**WILLIAM FELDMAN, Deputy Assistant Commissioner**

**CONDITION OF PATENT APPLICATIONS AS OF April 2, 1983**

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—D. E. TALBERT, Director ..... Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metallurgical Apparatus; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices. | 1-16-81 |
| GENERAL ORGANIC CHEMISTRY, GROUP 120—C. E. VAN HORN, Director ..... Heterocyclic Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides. | 11-20-81 |
| HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—J. O. THOMAS, JR., Director .... Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g., Coating; Molding; Ink; Prosthdontics; Adhesive and Abrading Compositions; Molding, Shaping, Treating Process, and Apparatus Therefor; Irradiation (Part); Bleaching; Dyeing; Leather, Fur and Textile Treating Compositions. | 3-1-82 |
| COATING, LAMINATING AND PHOTOGRAPHY, GROUP 160—S. N. ZAHARNA, Director ..... Coating: Processes, Apparatus and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; and Photography. | 3-09-82 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—R. F. WHITE, Director ..... Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes. | 1-12-82 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—S. W. ENGLE, Director Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Horology; Acoustics; Recorders; Weighing Scales. | 5-22-81 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—KENNETH L. CAGE, Director ..... Ordnance, Firearms and Ammunition; Lubrication; Illumination; Nuclear Reactors; Acoustics, Communications, Optics; Radar; Directional Radio; Torpedoes; Seismic Exploring; Cathode Ray Tube Circuitry; Cryptography; Laser Devices; Radioactive Materials; Powder Metallurgy, Rocket Fuels; Special, Fuel, Explosive and Thermic Compositions; Thermal and Photoelectric Batteries. | 3-30-81 |
| INFORMATION TRANSMISSION, STORAGE, AND RETRIEVAL, GROUP 230—EARL LEVY, Director ..... Communications; Multiplexing Techniques; Television; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts. | 1-05-81 |
| RECEPTACLES, CLEANING, WINDING, AND MEASURING, GROUP 240—G. M. FORLENZA, Director ..... Receptacles; Bearings; Joint Packing; Conduits; Switches; Presses; Plumbing Fixtures; Textile Spinning; Cleaning; Food Treating; Agitating; Centrifugal Separating; Geometrical Instruments; Sound Recording; Image Projectors; Web Feeding; Winding and Reeling; Cable Hoists; Measuring and Testing; Indicating; Fluent Material Handling; Shaft; Impellers; Rotary Fluid Motors. | 5-12-81 |
| ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—S. S. MATTHEWS, Director ..... Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring. | 8-25-80 |
| DESIGN, GROUP 290—KENNETH L. CAGE, Director ..... Industrial Arts; Household, Personal and Fine Arts. | 1-30-81 |
| **MECHANICAL EXAMINING GROUPS** | |
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| MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—STEPHEN G. KUNIN, Director Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion-Bonding, Metal Founding; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks; Fishing, Etc.; Butchering; and Books and Printed Matter. | 7-27-81 |
| AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—R. E. AEGERTER, Director ..... Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Plants; Harvesting; Earth Working and Excavating; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry, Printing; Typewriters; Information Dissemination. | 8-27-82 |
| HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—D. J. STOCKING, Director ..... Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Couplings; Gearing; Fluid Handling and Control; Lubrication. | 11-17-80 |
| GENERAL CONSTRUCTIONS, TEXTILES, MINING AND GEARING, GROUP 350—A. L. SMITH, Director ..... Building Structures; Racks; Cabinets; Closures; Supports; Furniture; Fasteners; Locks; Pipe Couplings; Joints; Miscellaneous Hardware; Textiles; Sewing Machines; Apparel; Footwear; Earth Engineering; Earth Drilling; Mining; Wells; Roads; Bridges; Tool Driving; Gearing; Machine Elements; Clutches. | 9-17-80 |

**Expiration of patents**: The patents within the range of numbers indicated below expire during April 1983, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

**Patents** ..... Numbers 3,243,822 to 3,248,737, inclusive

**Plant Patents** ..... Numbers 2,616 to 2,627 inclusive

# REEXAMINATIONS

JULY 5, 1983

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

**B1 Re. 29,285 (101st)**

## METHOD FOR CONCOMITANT PARTICULATE DIAMOND DEPOSITION IN ELECTROLESS PLATING, AND THE PRODUCT THEREOF

**Theodore Peter Christini, Dushore, Pa.; Albert Lawrence Eustice, Lewiston, N.Y.; Arthur Hughes Graham, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 208,233, Dec. 15, 1971, abandoned.**

**Reexamination Request No. 90/100,120, Dec. 3, 1981.**

**Reexamination Certificate for Patent No. Re. 29,285, issued Jun. 28, 1977, Ser. No. 694,047, Jun. 7, 1976.**

**U.S. Cl. 428/544** **Int. Cl.³ C23C *3/02***

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **4** and **6** is confirmed.

Claims **1–3** are determined to be patentable as amended:

Claim **5**, dependent on an amended claim, is determined to be patentable.

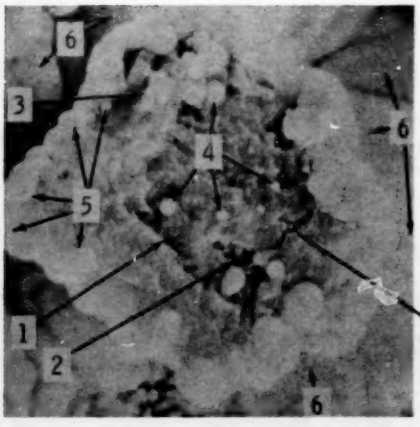
New claims **7–14** are added and determined to be patentable.

**1.** A coated article formed by electroless plating comprising a co-deposited uniform, dispersion of *polycrystalline* diamond particles secured by substantial nucleation within a metallic matrix comprising one of the group consisting of: (1) an alloy including a metal of the sub-group made up of nickel, cobalt and mixtures thereof with one of the elements phosphorus, boron and mixtures thereof and (2) elemental copper, deposited on a supporting substrate consisting of polymer, metal, ceramic or glass.

**2.** A method of forming a composite structure on an article by electroless plating comprising immersing said article in a stable electroless plating bath having a composition effecting concurrent deposition of particulate *polycrystalline* diamond *having a particle size in the range of 0.1μ to 75μ* dispersed in a metallic matrix comprising one of the group consisting of: (1) an alloy including a metal of the sub-group made up of nickel, cobalt and mixtures thereof with one of the elements phosphorus, boron and mixtures thereof and (2) elemental [elemental] copper, while maintaining agitation of said bath retaining said particulate diamond in suspension, and removing said article carrying said composite structure from said bath [when] *after* said composite structure has been plated out on said article in preselected amount.

ELECTROLESS Ni-B /12μ SYNTHETIC DIAMOND "A", 6340X

FIG. I




(1) RECESSED GROWTH LEDGE

(2) CRATER

(3) UPSTANDING GROWTH PROJECTION

(4) Ni-B ALLOY GRAINS NUCLEATED ON DIAMOND "A" SURFACE

(5) Ni-B ALLOY GRAINS NUCLEATED ON DIAMOND "A" EDGES

(6) Ni-B ALLOY GRAIN MATRIX

(7) DIAMOND SURFACE

**B1 3,892,984 (102nd)**

## REGENERATING CIRCUIT IN THE FORM OF A KEYED FLIP-FLOP

**Karl-Ulrich Stein, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany.**

**Reexamination Request No. 90/000,124, Dec. 14, 1981.**
**Reexamination Certificate for Patent No. 3,892,984, issued Jul. 1, 1975, Ser. No. 442,084, Feb. 13, 1974.**
**Claims priority, application Fed. Rep. of Germany, Feb. 23, 1973, 2309192.**
**U.S. Cl. 307/530** **Int. Cl.[3] H03K** *5/24, 3/356;* G11C *7/06*

### AS A RESULT OF REEXAMINATION IT HAS BEEN DETERMINED THAT:

Claims **1** to **7** are determined to be patentable as amended:

New claims **8–10** are added and determined to be patentable.

**1.** A regenerating circuit *system* in the form of a keyed *field-effect transistor* flip-flop for *"0" and "1" logic level* binary signals, in particular for the readout *of such binary logic* signals of integrated single-transistor storage elements forming a storage field in which the single-transistor storage elements are connected over a digit line to the flip-flop, characterized in that *first and second digit lines each with an associated digit line self-capacitance are provided and with each connecting to a group of storage elements and a respective dummy element; and wherein* the regenerating circuit comprises at least two inverting amplifier stages with feedback *connected between first and second nodes;* **[**, at least one barrier transistor disposed at the signal imput between the associated digit line and the corresponding amplifier stage**]** *first and second barrier field effect transistors respectively connected at the first and second nodes so as to connect the respective first or second node with the respective associated first or second digit line* **[**.**]**; means for selectively effecting a discontinuance of the feedback function **[**and means for selectively adjusting bias potentials at the inputs of the regenerating circuit.**]** *of the flip-flop; first potential means connected for selectively setting a bias potential on the respective gates of the first and second barrier transistors; second potential means connected for precharging the digit lines and a node self-capacitance of the flip-flop first and second nodes; and the first and second barrier transistors, the first and second potential means, and the means for discontinuance of the feedback function being provided such that after a selection of a storage element for reading of the stored binary signal therein the respective barrier transistor associated with the storage element signal level being readout forms a barrier for a portion of time thereby isolating the associated flip-flop node self-capacitance from the associated bit line self-capacitance, and so as to permit the flip-flop to assume a stable state corresponding to the binary signal being read when substantial feedback is initiated, said flip-flop action being used to refresh one of the logic level binary signals stored prior to readout over said same respective barrier transistor, a refresh path for said logic level binary signal being formed to extend from said associated node of the flip-flop over said barrier transistor to the readout storage element.*

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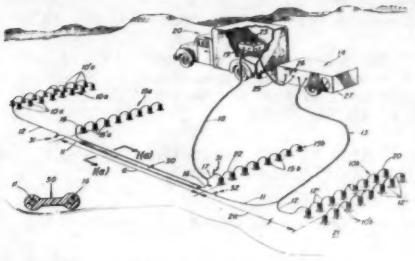
**B1 4,295,096 (103rd)**

## ELECTRODE PROSPECTING METHOD PROVIDING CALCULABLE ELECTROMAGNETIC COUPLING FOR THE INDIRECT DETECTION OF HYDROCARBON RESERVOIRS

**Ben K. Sternberg; Dale E. Miller; Dhari S. Bahjat, all of Ponca City, Okla., assignors to Conoco, Inc., Ponca City, Okla.**

**Reexamination Request No. 90/000,238, Aug. 5, 1982.**
**Reexamination Certificate for Patent No. 4,295,096, issued Oct. 13, 1981, Ser. No. 971,177, Dec. 30, 1978.**
**U.S. Cl. 324/357** **Int. Cl.[3] G01V** *3/06*



### AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **4** having been finally determined to be unpatentable, is cancelled.

Claims **1, 5, 6, 9, 11** are determined to be patentable as amended:

Claims **2, 3, 7, 8,** and **10,** dependent on amended claims, are determined to be patentable.

**9.** A method of electrical hydrocarbon prospecting, *using an electrode array in which a portion of its conductor means is closely spaced,* to investigate a subsurface polarizable stratum which is indicative of the presence of a hydrocarbon deposit lower than the stratum wherein a first set of space electrode means is placed in the surface of the ground in electrical communication with said stratum, a second set of space electrode means is placed in the surface of the ground in electrical communication with said stratum, with generating means coupled through second conductor means to said second set of electrode means, and a voltage measuring means coupled through a first conductor means to said first set of spaced electrode means, an improvement comprising:

(a) maintaining a calculable electromagnetic coupling between said first and second conductor means *where said means are closely spaced;*

(b) measuring the current through said second conductor means to said second set of spaced electrical means; and

(c) recording in time synchronism voltage that is measured through said first conductor means from said first set of spaced electrical means by said voltage measuring means, and said measured current, whereby an anomaly indication of a hydrocarbon deposit can be ascertained by processing from the measured current and voltage and said calculable **[**electromagnetic**]** *electromagnetic* coupling**[**.**]**, *said processing including the step of ascertaining a decoupled phase angle by subtracting the electromagnetic coupling phase angle from a measured phase angle.*

# DEFENSIVE PUBLICATIONS

## PUBLISHED JULY 5, 1983

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

### T103,201
### ADJUSTABLE RECLINE-CONTROL MECHANISM FOR FURNITURE AND FURNITURE COMPRISING THE MECHANISM

**James D. Robinson, 3 The Jinnings, Welwyn Garden City, Hertfordshire, England**

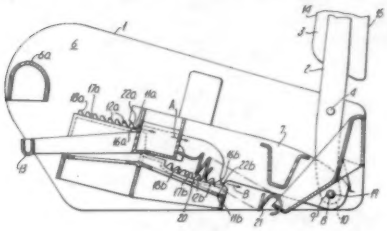
**Filed Dec. 7, 1981, Ser. No. 328,391**

**Claims priority, application United Kingdom, Dec. 31, 1980, 8041570**

**Int. Cl.³ A47C *1/025***

**U.S. Cl. 297—367**

**4 Sheets Drawing. 13 Pages Specification**



An adjustable recline-control mechanism for furniture of the type comprising a carrier for an occupant, e.g. a seat-pan and a support e.g. a back-rest, reclinable relative to the carrier wherein the angle of recline is controlled by the mechanism which comprises a link one end of which is pivotally connected to the support while the other end is latchable by at least two co-operating latching portions which respectively prevent travel of the link in opposite directions, the respective latching portions being spaced apart relative to the pivot axis of the link such that a jolt to the front or back of the support exerts on the link a moment which biasses the link towards latching irrespective of the direction of the jolt. Each latching portion suitably comprises a fixed toothed array and a cooperable displaceable tooth array, at least one tooth in each array comprising a thrust face and the teeth being arranged so that projections normal to a thrust face in each of the latching portions pass respectively on opposite sides of the pivot axis of the link. The mechanism is suitably incorporated into furniture, especially a motor vehicle seat, and is of utility in household and garden furniture.

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### T103,202
### PRODUCTION OF PURIFIED STRONG WET-PROCESS PHOSPHORIC ACID

**Alva W. Frazier, 2219 Randolph, and Ewell F. Dillard, Rte. 10, Box 196, both of Florence, Ala. 35630**

**Filed Sep. 13, 1982, Ser. No. 417,804**

**Int. Cl.³ C01B *25/16***

**U.S. Cl. 423—321 R**

**No Drawing. 41 Pages Specification**

The concentration of impurities in wet-process phosphoric acid limits the usefulness of the acid for the production of fertilizers, feed-grade phosphate and detergents. The aluminum, magnesium, and fluoride impurities are removed with the calcium sulfate hemihydrate filter cake by hydrolyzing and recycling the off-gas scrubber solutions in the presence of a ferric iron catalyst. The aluminum and magnesium are reduced to less than 0.1 percent in the acid product by the precipitation of $(Ca,Mg)Al_2F_8.2H_2O$, which is acid insoluble and suitable for storage with the byproduct calcium sulfate. Ferric iron also serves as a catalyst for the simultaneous precipitation of $(Na,K)_2SiF_6$. Subsequent additions of potassium as, for example, in the teachings of Gilbert (U.S. Pat. No. 3,338,675), can then be applied to obtain a purified phosphoric acid product suitable for most commercial applications. The added potassium serves two purposes in the 40 to 55 percent $P_2O_5$ acid since ferric iron is reduced to 0.25 percent $Fe_2O_3$ by the precipitation of $Fe_3KH_{14}(PO_4)_8.4H_2O$ and the $SiF_6^{=}$ is reduced to about 0.2 percent by the precipitation of $K_2SiF_6$. This subsequent precipitate contains about 50 percent $P_2O_5$ and is as effective as superphosphate $[Ca(H_2PO_4)_2.H_2O]$ in supporting plant growth.

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### T103,203
### THIN LAYER DEPOSITION PROCESS

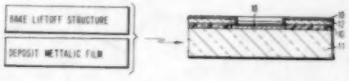
**Timothy W. Carr, 22 Kimball Dr., Poughkeepsie, N.Y. 12603; Charles D. Needham, Thornacre Rd., Wappingers Falls, N.Y. 12590, and Robert T. Villetto, Jr., 12 Hasbrouck Dr., Poughkeepsie, N.Y. 12601**

**Continuation of Ser. No. 106,608, Dec. 26, 1979, abandoned. This application Aug. 16, 1982, Ser. No. 408,332**

**Int. Cl.³ H01L *21/443***

**U.S. Cl. 427—91**

**1 Sheets Drawing. 16 Pages Specification**



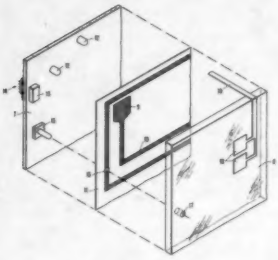

A method of preventing out-gassing from lift-off structures formed of positive resists (as for example, o-quinone diazide/-phenol formaldehyde novolak resins) during vacuum evaporation of metals in the fabrication of semiconductor devices. Such outgassing is avoided by compositional control of the photosensitive resist lift-off layer and by providing an additional baking step after the lift-off mask has been formed. Both conditions are required and critical to avoid the volatile resin decomposition products which not only tend to contaminate the device substrate surface, but also the deposited metal film. The method employs a photosensitive polymer which contains about 10 to 20 wt. % of the sensitizer (e.g. o-quinone diazide) in conjunction with a secondary baking step at about 160° to about 200° C. after the lift-off mask has been formed and prior to metal film deposition. As a result the method provides an improved metal film as well as increased through-put, particularly when forming Schottky barrier diode contacts.

**T103,204**

## PROCESS CONTROL DISPLAY PANEL

**Carter E. Dorrell, 1113 10th St., Boulder, Colo. 80302; Donald E. Gutscher, 412 Sumner St., Longmont, Colo. 80501, and Carol J. Huffman, 2224-B Mapleton Ave., Boulder, Colo. 80302**

**Filed Feb. 12, 1982, Ser. No. 348,577**
**Int. Cl.³ H05K *1/00, 1/18***
**U.S. Cl. 428—42**
**5 Sheets Drawing. 7 Pages Specification**



An easily modified, brilliantly backlit, switch controlled panel graphically represents a process. An operator panel includes a frame holding a light-transmitting screen in front of circuit boards connected to a computer and to the controlled process. The screen displays symbols, placed on the screen with self-sticking tape, representing process steps and controls, transparent touch-sensitive switches, lights, illuminated digital displays, and the like. The switches, lights and displays connect to the circuit boards.

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**T103,205**

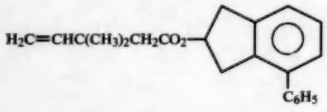
## INTERMEDIATES AND PROCESS FOR INSECTICIDAL 4-PHENYL-2-INDANYL ESTERS

**Philip A. Cruickshank, 211 Dodds La., Princeton, N.J. 08540**

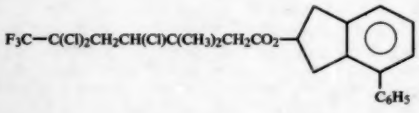
**Continuation of Ser. No. 286,309, Jul. 24, 1981, abandoned. This application Aug. 11, 1982, Ser. No. 407,230**
**Int. Cl.³ C07C *67/317***
**U.S. Cl. 560—124**
**No Drawing. 21 Pages Specification**

Compounds of formulae II, III and IV:

II

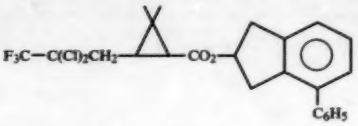


III



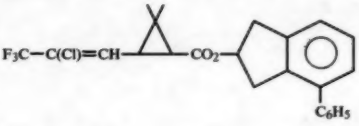
-continued

IV

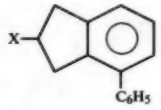


are useful intermediates for preparation of an insecticidal compound of formula (I):

I



The intermediate II is prepared by reacting the acid halide, alkali metal salt, or lower alkyl ester of 3,3-dimethyl-4-pentenoic acid with a compound of the formula



in which X is a hydroxy group or a leaving group. Intermediate III is prepared by reacting II with 1,1,1-trichloro-2,2,2-trifluoroethane in the presence of a solvent, a solvating agent, and a catalyst. Intermediate III is then di-dehydrochlorinated in the presence of base, in one or two steps, to produce I.

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**T103,206**

## PRODUCTION OF UREA PHOSPHATE

**Harry T. Lewis, 802 Meadow La., and Ewell F. Dillard, Rte. 10, Box 196, both of Florence, Ala. 35630**

**Filed Nov. 24, 1981, Ser. No. 324,515**
**Int. Cl.³ C07C *127/01, 126/08***
**U.S. Cl. 564—363**
**4 Sheets Drawing. 36 Pages Specification**

A two-stage continuous crystallization process for production of urea phosphate by reaction of impure wet-process orthophosphoric acid (about 54 percent $P_2O_5$) and urea with simultaneous addition of a selected acidifying agent (sulfuric acid, hydrochloric acid, or phosphoric acid) to clarified mother liquor used as recycle in the process. Addition of the acidifying agent decreases pH in the crystallization process whereby the solubility of a contaminating water-insoluble iron phosphate-urea salt [$FeH_3(PO_4)_2.2CO(NH_2)_2$] is increased, purity of the crystalline urea phosphate product is improved significantly, and the useful storage life of the recycle mother liquor is prolonged.

# REISSUES

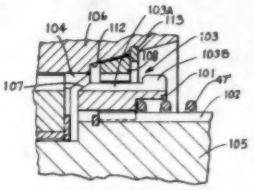
JULY 5, 1983

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

## Re. 31,296
## TRANSMISSION WITH RESILIENTLY LOADED MAINSHAFT GEARS

Elmer A. Richards, Kalamazoo, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Reissued No. Re. 29,601, dated Apr. 4, 1978, Ser. No. 750,299, Dec. 13, 1976.
Original No. 3,921,469, dated Nov. 25, 1975, Ser. No. 452,825, Mar. 20, 1974. Division of Ser. No. 276,376, Jul. 31, 1972, Pat. No. 3,799,002. Application for reissue Oct. 12, 1979, Ser. No. 84,261
Int. Cl.³ F16H *3/38*; F16D *13/00, 21/02*
U.S. Cl. 74—339 3 Claims




10. In an interengageable jaw clutch system, the combination comprising:

a rotatable shaft and a first jaw clutch portion mounted thereon for axial sliding movement relative to said shaft and positive rotation therewith about an axis, said first jaw clutch portion defining a plurality of radially outwardly extending external drive teeth thereon;

a gear coaxially related to said shaft and a second jaw clutch portion fixed to said gear, said second jaw clutch portion defining a plurality of radially inwardly extending internal drive teeth thereon for interengagement with said external drive teeth of first jaw clutch portion upon relative axial movement of said jaw clutch portions toward one another; said first jaw clutch portion drive teeth at a radius suitable for engaging with drive teeth on said second jaw clutch portion, said drive teeth having leading edges for engagement with the clutch teeth of the other jaw clutch portion and defining the effective drive portions of said drive teeth, said first jaw clutch portion having also blocking teeth, said blocking teeth having leading portions generally axially aligned with the effective drive portions of said external drive teeth and trailing portions generally axially offset the effective drive portions of said external drive teeth, said trailing portions extending radially beyond the outer radial surfaces of said leading portions;

means to selectively axially move said gear relative to said shaft from a first position wherein said second clutch member is axially spaced from said first clutch member to a second position for engagement of said clutch members;

means resiliently biasing said first clutch portion toward said second portion and a stop member limiting axial movement of said first clutch portion to a position axially spaced from said second clutch portion when said gear is in said first position;

blocker means coacting between said first and second jaw clutch portions for positively preventing engagement of said jaw clutch portions so long as a substantial difference in relative speed exists therebetween, said blocker means including an annular blocker having blocking portions arranged on and supported by said drive teeth for limited rotation with respect thereto and positioned axially between the trailing portion of said blocking teeth and said clutch teeth when said jaw clutch portions are disengaged, one of said trailing portions of said blocking teeth and said blocking portion defining an array of spaces in cross section, said spaces capable of receiving therein the other of said trailing portions of said blocking teeth and said blocking portions when said spaces and said other of said trailing portions and said blocking portions are aligned to permit said blocking portions to relatively move axially past said trailing portions of said blocking teeth so that said jaw clutch portions can be engaged with one another; and

a surface on said blocker frictionally cooperating with a surface on said second jaw clutch portion for causing said blocker to tend to rotate relative to said first jaw clutch portion to the extent permitted by said drive teeth wherever and for so long as a substantial difference in relative rotative speeds exist between said respective jaw clutch portions, said blocking portions interferring with said trailing portions of said blocking teeth when said blocker is rotated relative to said first jaw clutch portion to the extent permitted by said drive teeth so as to prevent engagement of said jaw clutch portions.

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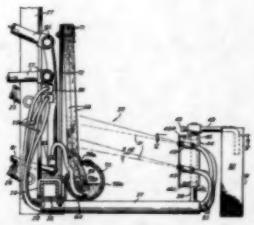
## Re. 31,297
## FULL COVERAGE RECIRCULATING SPRAYER

John O. Moore, West Helena, and Ray H. Dawson, Lexa, both of Ark., assignors to Sprayrite Manufacturing Co., West Helena, Ark.

Original No. 4,168,798, dated Sep. 25, 1979, Ser. No. 874,396, Feb. 2, 1978. Application for reissue Jul. 1, 1980, Ser. No. 165,132
Int. Cl.³ B05B *1/28*
U.S. Cl. 239—121 31 Claims



1. A full-coverage recirculating sprayer assembly for application of herbicidal and other liquids via [solid] *spray* streams selectively to standing vegetation with recapture of liquid not contacting the vegetation, the sprayer assembly being carried on a vehicle for traversing an agricultural area in a direction; the assembly comprising a source of pressurized liquid carried on said vehicle, a horizontal bar carried on said vehicle and extending laterally of said direction; and a plurality of [solid-stream] *spray-stream* spray nozzles communicating to said source of pressurized liquid, a collector means placed to intercept said streams, and at least one reservoir located below said collector, all carried by said bar, and wherein:

the spray nozzles direct said streams at an angle to the direction of travel of at least 15°;

the spray nozzles are arranged in opposed pairs to provide [complete, criss-cross coverage to] *criss-cross spray patterns covering* all parts of the area traversed;

said collector means comprising *vertically disposed support means and collector mat means formed of* a [mat] *fibrous* material *and* having a vertical orientation *with a connection*

*at the upper end with said support means* and a lower edge; [and]

said reservoir *being disposed* enclosing said lower edge of the collector mat and adapted to collect liquid flowing from the collector[, whereby to reduce wind and travel speed effects on the solid streams of liquid and splashing of said streams as they strike said weeds] *and said reservoir having an abutment surface projecting forwardly in the direction of travel of the vehicle to impact against vegetation and bend it over towards and into said spray patterns.*

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**Re. 31,298**

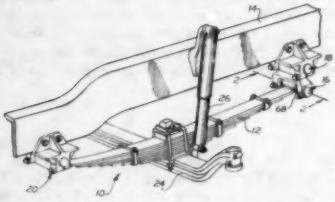
## SPRING SHACKLE ASSEMBLY

**Edward J. Herbenar, Birmingham, Mich., assignor to TRW Inc., Cleveland, Ohio**

**Original No. 4,083,545, dated Apr. 11, 1978, Ser. No. 719,190, Aug. 31, 1976. Application for reissue Jul. 31, 1979, Ser. No. 62,536**

**Int. Cl.³ B60G *11/12***

**U.S. Cl. 267—54 A** **15 Claims**



*11. A pivot means constructed to interconnect first and second members for angular displacement of one of said members relative to the other of said members about a fixed pivot axis;*

*said pivot means comprising a pair of ball studs;*

*each of said ball studs having a shank portion and a head portion;*

*said shank portions being in axial alignment with the ends of said shank portions being in juxtaposed relationship;*

*a sleeve surrounding said shank portions supported by one of said members;*

*a pair of socket means enclosing said head portions of said pair of ball studs;*

*each of said socket means being secured to the other of said members.*

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**Re. 31,299**

## ION-SELECTIVE ELECTRODE DEVICE FOR POLAROGRAPHIC MEASUREMENT OF OXYGEN

**Manfred Kessler, and Jens Höper, both of Dortmund, Fed. Rep. of Germany, assignors to Max Planck Gesellschaft zur Foerderung der Wissenschaften, Goettingen, Fed. Rep. of Germany**

**Original No. 4,263,115, dated Apr. 21, 1981, Ser. No. 921,259, Jul. 3, 1978. Application for reissue Mar. 12, 1982, Ser. No. 357,563**

**Claims priority, application Fed. Rep. of Germany, Jul. 4, 1977, 2730143**

**Int. Cl.³ G01N *27/30***

**U.S. Cl. 204—415** **12 Claims**

1. An ion-sensitive electrode device for measuring oxygen concentrations comprising

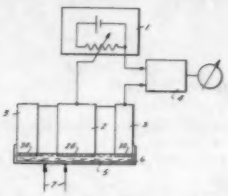
a source of potential voltage;

a reduction electrode for the oxygen composed of a noble metal and connected to said voltage source;

a reference electrode annularly disposed about said reduction electrode;

a ligand membrane provided in front of the reduction electrode, the said ligand membrane containing a cation-selective carrier and being permeable to hydrogen ions;

a closure membrane to seal the said electrodes against the outside space, the closure membrane being permeable to oxygen and impermeable to water, and an aqueous elec-



trolyte containing the ligand cation of the said ligand membrane, the said electrolyte being disposed between said ligand membrane and said closure membrane.

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**Re. 31,300**

## PROCESS FOR PREPARING ALKYL- OR ARYLPHOSPHONOTHIOIC DIHALIDES

**Eugene H. Uhing, Pleasantville, N.Y., and Arthur D. F. Toy, Stamford, Conn., assignors to Stauffer Chemical Company, Westport, Conn.**

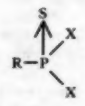
**Original No. 3,968,156, dated Jul. 6, 1976, Ser. No. 534,942, Dec. 20, 1974. Application for reissue Jan. 5, 1979, Ser. No. 1,633**

**The portion of the term of this patent subsequent to Jul. 29, 1992, has been disclaimed.**

**Int. Cl.³ C07F *9/42***

**U.S. Cl. 260—543 P** **6 Claims**

1. A method of preparing compounds of the formula:



(I)

wherein R is a hydrocarbyl group consisting essentially of hydrogen and carbon including $C_1$ to $C_{20}$ alkyl; the aryl substituted derivatives thereof, said aryl having 1 or 2 fused rings, cycloalkyl of 5–6 carbons in the ring, aryl of up to 3 fused rings, biphenyl and the $C_1$–$C_4$ alkyl substituted derivatives of said cycloalkyl, aryl or biphenyl and X is chlorine or bromine, comprising contacting under at least an autogenous pressure *in a reaction zone capable of withstanding elevated pressure* at a temperature of from about 175° C. to about 400° C. in the presence of *combinations of* phosphorus sulfides an alkyl or aryl halide of the formula:

$$RX \qquad \text{(II)}$$

wherein R and X are as defined above with a trivalent phosphorus trihalide of the formula:

$$PX_3 \qquad \text{(III)}$$

or a pentavalent thiophosphoryl halide of the formula:

$$P(S)X_3 \qquad \text{(IV)}$$

or mixtures thereof wherein X is as defined above[.] *said reactants being contacted approximately according to the following general scheme:*

$$3RX + aPX_3 + bp(S)X_3 + \frac{[P_4S_{(6-2b)}]}{2} \rightarrow 3RP(S)X_2$$

*wherein R and X are as defined above and a plus b equals 1.*

**Re. 31,301**

## INTRAMAMMARY COMPOSITIONS

**John S. Dowrick, Littlehampton, England, assignor to Beecham Group p.l.c., England**

**Original No. 4,282,202, dated Aug. 4, 1981, Ser. No. 88,859, Oct. 29, 1979. Application for reissue Feb. 3, 1982, Ser. No. 345,474**

**Claims priority, application United Kingdom, Oct. 27, 1978, 42336/78**

**Int. Cl.**[3] **A61K** *9/06, 9/08, 9/10, 9/18*

**U.S. Cl. 424—23** **43 Claims**

1. A liquid veterinary composition adapted for intramammary administration comprising a suspension of a powered solid pharmaceutically acceptable alkali metal, alkaline earth metal or amine salt of clavulanic acid in an amount of from **[1]** *0.1* to 40% by weight of said composition calculated on the basis of the equivalent weight of free clavulanic acid, and from 5 to 20% by weight of a powdered solid molecular sieve in a pharmaceutically acceptable oil carrier.

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**Re. 31,302**

## VALIDATION SYSTEMS FOR CREDIT CARD OR THE LIKE

**Leon Stambler, 534 Longacre Ave., Woodhaven, N.Y. 11598**

**Original No. 3,786,420, dated Jan. 15, 1974, Ser. No. 227,146, Feb. 17, 1972. Continuation of Ser. No. 648,522, Jan. 12, 1976, Pat. No. 3,786,420. Application for reissue Jul. 23, 1979, Ser. No. 59,784**

**Int. Cl.**[3] **H04Q** *9/00;* **G06K** *9/00*

**U.S. Cl. 340—825.34** **19 Claims**

1. In a system where the owner of an information bearing card such as a credit card or the like is in the sole possession of a predetermined memorized number of a given number of significant digits, said credit card having on a surface thereof a plurality of first indicia corresponding to said predetermined number and a plurality of second indicia corresponding to a code determining how said first indicia is manifested on said information bearing card, in combination therewith apparatus for verifying that said number and said first indicia correspond, comprising:

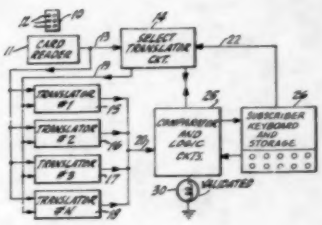
a. first means including a keyboard for storing said number after insertion thereby by an owner,

b. second means responsive to both said first and second indicia on said credit card for providing at an output thereof an electrical signal according to said indicia,

c. third means responsive to a digit of said number as stored to provide a first control signal and then responsive to only said second indicia for providing any one of a plurality of control signals each one operative to determine how said first indicia is to be translated,

d. a plurality of translating means coupled to said second means, each one capable of responding to said electrical signal output representative of said first indicia to provide a decoded signal therefrom according to the particular format of said translator, each of said decoded signals representative of a digit contained in said predetermined number when translated according to said second indicia,

e. translating selector means responsive to said control signals and coupled to said translating means to cause a first




one of said translating means to be selected according to said first control signal and thereafter others of said translating means to be selected according to said plurality of control signals, whereby different selected ones of said translating means provide different digits of said number according to said second indicia on said credit card, and

f. comparison means responsive to said decoded signals and said stroed number to provide an output when said decode signals correspond to said stored number, said output verifying that said memorized number and said first indicia on said card correspond.

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**Re. 31,303**

**Patent Not Issued For This Number**

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# PLANT PATENTS

## GRANTED JULY 5, 1983

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

5,065

### AFRICAN VIOLET NAMED PINK LADY

Arnold W. Fischer, Hanover, Fed. Rep. of Germany, assignor to Pan-American Plant Company, Parrish, Fla.

Filed Apr. 10, 1981, Ser. No. 252,894

Int. Cl.[3] A01H *5/00*

U.S. Cl. Plt.—69 1 Claim

1. A new African Violet cultivar, substantially as herein shown and described, characterized by the large, star-shaped flowers and the phlox pink coloring of its profusely produced flowers.

5,066

### AFRICAN VIOLET NAMED BIG STAR

Arnold W. Fischer, Hanover, Fed. Rep. of Germany, assignor to Pan-American Plant Company, Parrish, Fla.

Filed Apr. 10, 1981, Ser. No. 252,895

Int. Cl.[3] A01H *5/00*

U.S. Cl. Plt.—69 1 Claim

1. A new and distinct African Violet cultivar, substantially as herein shown and described, distinguished by its vigorous growth habit and its profuse production of very large, dark blue, star-shaped flowers atop a plant of generally rosette shape.

# PATENTS

## GRANTED JUL. 5, 1983

### ERRATA

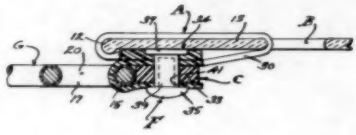
| For CLASS | See PATENT NO. |
|---|---|
| 604–110 | 4,391,272 |
| 604–110 | 4,391,273 |
| 604–190 | 4,391,274 |
| 604–266 | 4,391,276 |
| 177–210 | 4,391,338 |
| 182–141 | 4,391,345 |
| 339–075 | 4,391,408 |
| 273–142 | 4,391,442 |
| 384–152 | 4,391,474 |
| 384–226 | 4,391,475 |
| 549–525 | 4,391,753 |
| 423–659 | 4,391,880 |
| 435–042 | 4,391,887 |
| 236–036 | 4,391,913 |
| 215–307 | 4,392,055 |
| 382–022 | 4,392,120 |
| 366–129 | 4,392,168 |
| 346–154 | 4,392,194 |

# PATENTS

## GRANTED JULY 5, 1983

## GENERAL AND MECHANICAL

**4,390,995**
**SHOCK DAMPING FACE GUARD STRAP FOR FOOTBALL HELMETS**
**Vernon R. Walck, 267 Bonita Dr., Bakersfield, Calif. 93305**
**Filed Mar. 3, 1982, Ser. No. 354,169**
**Int. Cl.³ A41D *13/00*; A42B *3/00***
**U.S. Cl. 2—9** **13 Claims**



1. Shock damping anchor straps for a face guard mounted on a transverse horizontal axis to a brow portion of a protective helmet, the face guard having a mounting bar rotatably mounted to the helmet on said axis and extending rearward at opposite sides of the helmet, and the face guard having opposite side anchor bars depending from the mounting bar at the front edges of opposite side ear portions of the helmet, there being an ear hole through each side ear portion of the helmet, and each anchor strap including a flexible body with inner and outer loop portions continuing one into the other from one end provided with a hole therethrough and to a terminal end, the hole at said one end being engaged over a fastener means and the inner loop portion formed into an inner loop wrapped around the front edge of the ear portion and passing through the ear hole of the helmet and secured by a second hole therethrough engaged over the fastener means, and the outer loop portion formed into an outer loop wrapped over the anchor bar and the said terminal end secured by a third hole therethrough engaged over and held by said fastener means.

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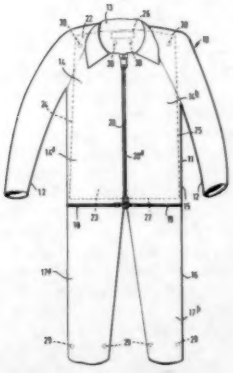
**4,390,996**
**GARMENT**
**Stuart W. Read, 87 Malvern Rd., St. Johns, Worcester, England**
**Filed Aug. 17, 1981, Ser. No. 293,673**
**Claims priority, application United Kingdom, Sep. 2, 1980, 8028302**
**Int. Cl.³ A41B *1/12***
**U.S. Cl. 2—70** **10 Claims**



1. A garment comprises a jacket and a trouser part, the jacket comprising a body having a lower edge at or above crotch level, two arms extending from the body, the trouser part comprising two legs, part of the upper edge of each leg being permanently attached to the lower edge of the body and the remainder of the upper edge being releasably attached to the lower edge of the body by fastening means thereby to provide a one piece suit, the jacket and trouser part each having co-operable retaining means whereby, when the fastening means are released and the trouser part folded relative to the jacket, the trouser part may be retained between the upper and lower edges of the body by said retaining means, whereby the garment may be worn as a jacket only.

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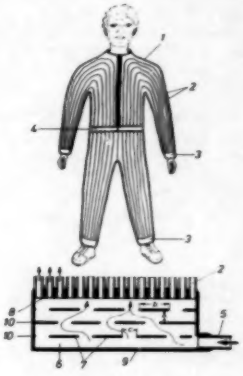
**4,390,997**
**HEAT PROTECTION GARMENT**
**Claus-Dieter Hinz, Lübeck, and Adalbert Pasternack, Bad Schwartau, both of Fed. Rep. of Germany, assignors to Drägerwerk Aktiengesellschaft, Fed. Rep. of Germany**
**Filed Jan. 16, 1981, Ser. No. 225,656**
**Claims priority, application Fed. Rep. of Germany, Feb. 2, 1980, 3004593**
**Int. Cl.³ A41D *13/00***
**U.S. Cl. 2—81** **6 Claims**



1. A heat protection garment comprising:
at least one manifold having opposite parallel end walls defining a mixing chamber;
at least one header having opposite parallel end walls defining a mixing chamber;
a plurality of coolant tubes connecting the manifold and header mixing chambers, the tubes connected to one end wall of each of the manifold and header;
at least one coolant supply conduit connected to the manifold mixing chamber at a location spaced from the coolant tubes connected thereto;
at least one coolant discharge conduit connected to the header mixing chamber at a location spaced from the coolant tubes connected thereto; and
a plurality of parallel rows of connecting pieces extending across the manifold and header mixing chambers respectively, between the conduits and the coolant tubes and parallel to the end walls of the manifold and header respectively;
the ratio, in each of the manifold and header of the number of coolant tubes to the number of parallel rows of connecting pieces to the number of coolant conduits being approximately equal to or smaller than 12:3:1; and
the ratio in each of the manifold and header of the spacing between the parallel rows of connecting pieces to the

length of each connecting piece in each row to the spacing between each connecting piece ineach row being approximately equal to or less than 1:3:1.

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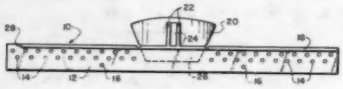
**4,390,998**

**PREFABRICATED CAP FRAME**

**Paul G. Gallin, Bronxville, N.Y., assignor to Art Cap Company, Inc.**

**Filed Jun. 1, 1981, Ser. No. 269,227**
**Int. Cl.³ A41C *5/00***
**U.S. Cl. 2—180** **12 Claims**



1. A prefabricated cap frame for a uniform cap of the type having a visor and a grommet for supporting and stretching the top of the cap comprising a one piece structure molded from a flexible synthetic resin and including a perforated band portion in the form of a substantially flat open strip adapted to be curved and joined at the ends to form the hat band,

said band portion including a thickened portion at the upper edge thereof for reinforcement,

and an integral vertical stay portion extending from the upper edge of said band portion.

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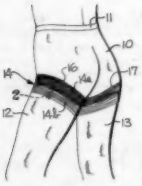
**4,390,999**

**PANTY HOSE WITH BODY BULGE CONTROL**

**J. William Lawson, Siler City, and Robert M. Matthews, Pittsboro, both of N.C., assignors to Kellwood Company, St. Louis, Mo.**

**Filed Dec. 29, 1980, Ser. No. 220,380**
**Int. Cl.³ A41B *11/04;* D04B *9/46;* A41B *9/10;* D04B *7/12***
**U.S. Cl. 2—409** **7 Claims**



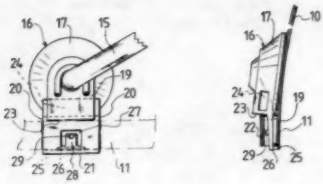
1. In a panty hose type garment including certain portions with elastic yarn in an amount sufficient to provide a relatively great amount of compressive force against the underlying portion of the body of the wearer, and other portions normally joined directly to said certain portions and being knit solely of stretchable yarn to provide a relatively small amount of compressive force against the underlying portion of the body of the wearer, the combination therewith of a body bulge controlling intermediate portion positioned between and interconnecting said certain and said other portions, said intermediate portion being knit of stretchable yarn with elastic yarn incorporated in spaced-apart courses and providing a lesser amount of elastic yarn in said intermediate portion than the amount of elastic yarn provided in said certain portions to provide a medium amount of compressive force against the portion of the body of the wearer underlying said intermediate portion, said successive great, medium, and small amounts of compressive forces applied by said corresponding certain, intermediate, and other portions of said garment thereby applying a gradually varying amount of compressive force against the underlying portion of the body to prevent an abrupt outward bulging of the corresponding portion of the body of the wearer.

**4,391,000**

**EAR MUFF MOUNTING DEVICE**

**Bo G. Lönnstedt, Kvarnbergsvägen 23, S-141 45 Huddinge, Sweden**

**Filed Mar. 9, 1982, Ser. No. 356,397**
**Int. Cl.³ A42B *3/00, 1/06***
**U.S. Cl. 2—423** **4 Claims**



1. A device for removably mounting an ear muff holder arm at a hard hat having a narrow pocket defined by substantially parallel side walls and having an open bottom, said device comprising a main body for rotatably receiving said holder arm and defined by a face adapted to rest against said hat, as well as a plate member having a shape suitable for fitting into said pocket, said plate member having an inward face to be directed towards said hat and being arranged at an angle less than 180° in relation to said face of said main body, as well as by substantially parallel side edges and a transverse lower edge, there being provided at said lower edge a ledge extending between said side edges and facing the same way as said inward face, there also being provided a ledge means, being narrower and shorter than said ledge, and being located above and parallel to the latter.

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**4,391,001**

**SOFT TOILET SEAT AND HINGE CONNECTOR**

**David E. Harrison, Columbus, Miss., assignor to Beatrice Foods Co., Chicago, Ill.**

**Filed Sep. 15, 1982, Ser. No. 418,388**
**Int. Cl.³ A47K *13/12***
**U.S. Cl. 4—236** **25 Claims**

1. A toilet seat component and hinge combination comprising:

a hinge member including an elongated connector spike having an upper sawtooth-shaped surface and a lower sawtooth-shaped surface; and

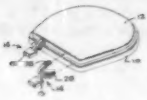
a toilet seat component including a female coupling means provided adjacent the rear edge of the toilet seat component for receiving and retaining said elongated connector spike to provide a permanent and secure attachment thereto, said female coupling means including:

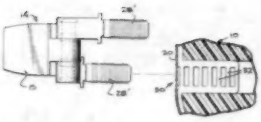
a plurality of horizontally aligned upper lock lugs;

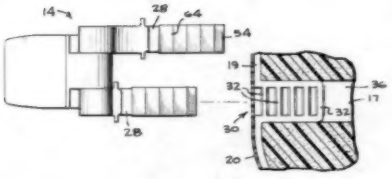
a plurality of horizontally aligned lower lock lugs positioned below and spaced from said upper lock lugs; and

said upper lock lugs and said lower lock lugs defining the upper extent and the lower extent of a coupling opening extending inwardly from the rear extent of said female coupling means, said coupling opening being dimensioned to matingly receive said elongated connector spike with the sawtoothed-shaped upper surface of the elongated connector spike lockingly engaging the upper lock lugs and the sawtooth-shaped lower surface of the elongated connector spike lockingly engaging the

lower lock lugs for effecting automatic locked retention of the elongated connector spike in the female coupling








in response to the insertion of the elongated connector spike into the female coupling opening.

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**4,391,002**

## WATER-CLOSET FOR VEHICLES, PARTICULARLY MOTOR COACHES

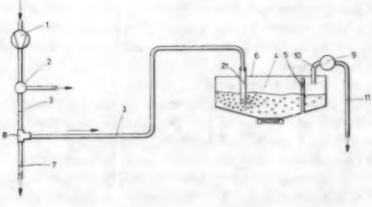
**Ernst Marti, Kalinach, Switzerland, assignor to Karl Kassbohrer Fahrzeugwerke GmbH, Ulm, Fed. Rep. of Germany**

**Filed Nov. 13, 1980, Ser. No. 172,197**

**Claims priority, application Fed. Rep. of Germany, Jul. 26, 1979, 2930403**

**Int. Cl.³ E03D *1/00***

**U.S. Cl. 4—321** **4 Claims**



**1.** In a water-closet for a vehicle including a completely closed sewage container for receiving faecal matter and sewage therein, said vehicle having a pressurized air supply system for operating brakes, doors, ventilation flaps and the like, said system including a compressor operable continuously during operation of the vehicle engine to supply pressurized air to a pressure tank, a pressure regulator for controlling the air pressure in the pressure tank, and a bypass duct connected to the regulator for exhausting excess air from the system when the pressure tank is at its operating pressure, the improvement comprising a tube extending into the container to a point close to the bottom of the container and connected to the bypass duct of the pressurized air supply system to continuously supply aerating air to said container during operation of the vehicle engine and when the pressure tank is at its operating pressure and to substantially continuously aerate faecal matter in said container during vehicle engine operation.

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**4,391,003**

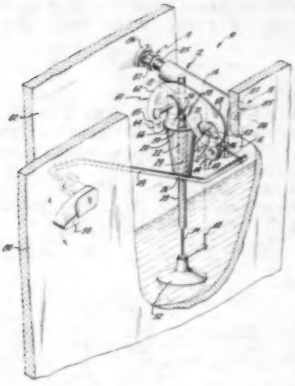
## WATER-SAVING DEVICE FOR USE WITH TOILETS

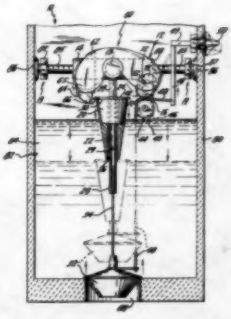
**Joseph M. Talerico, 103 W. Greenbrook Rd., and Henry Fleischer, 15 Wind Ridge Dr., both of North Caldwell, N.J. 07006**

**Filed Feb. 24, 1982, Ser. No. 351,666**

**Int. Cl.³ E03D *1/00, 1/14, 3/12***

**U.S. Cl. 4—415** **16 Claims**





**1.** A water-saving device for use in conjunction with a toilet bowl-tank assembly, which includes a tank having an outlet opening in the bottom thereof and means for replenishing water in the tank, comprising, in combination:

lower float means adapted to removably seat over the opening in the bottom of a toilet tank;

upper float means actuated upon flushing and adapted to float with the level of water in the toilet tank and contact the lower float means as the water level drops to a predetermined level in the toilet tank and thence force the

lower float means to seat over the opening in the bottom of the toilet tank;

locking means adapted to lock the upper float means in an immobile position out of contact with the lower float means when the toilet tank is filled with water;

float control means in communication with the locking means and connected to the lower float means which, upon flushing the toilet, is adapted to unseat the lower float means from the outlet opening in the toilet tank to allow water to drain out, while causing the locking means to unlock the upper float means to thereby allow the upper float means to fall with the falling level of water in the toilet tank whereby when the water level has fallen to a predetermined level, the upper float means contacts and weighs against the lower float means forcing it downwardly and seat over the outlet opening in the toilet tank and thereby preventing the water level in the tank from dropping any further, and as the water level rises in the tank the upper float means floats upwardly with the rising water level until it contacts the locking means and is locked into its immobile position while the lower float means, through the force of water bearing against it and suction, remains seated over the outlet opening in the toilet tank.

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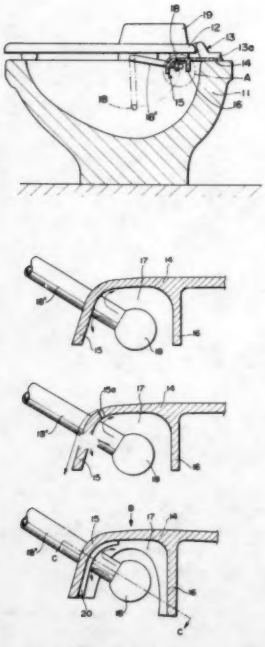
**4,391,004**

## SPRAYING DEVICE FOR USE IN TOILET BOWLS

**Shinji Kawai, Toyota; Koichi Suzuki, Chiryu, and Yuji Yamaguchi, Anjyo, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed May 7, 1982, Ser. No. 376,219**
**Claims priority, application Japan, May 9, 1981, 56-070021**
**Int. Cl.³ A61H *35/00*; A47K *3/22***
**U.S. Cl. 4—443** **5 Claims**



**1.** A spraying device for use in toilets of the type having a toilet bowl and toilet seat, which rectal spraying device comprises:

a spraying head for spraying water;

means mounting said spraying head in the toilet bowl for moving said spraying head between a first spraying position underlying the anal or rectal area of an individual seated on the toilet seat, and a second spraying position located at the side of the toilet bowl; and

a spray deflecting member mounted on the toilet bowl at said second spraying position for confronting said spraying head when said spraying head is moved to said second spraying position;

water ejected from said spraying head at said second spraying position being deflected back toward said spraying head.

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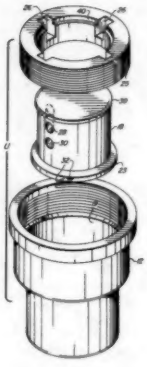
**4,391,005**

## APPARATUS FOR CLEANING SWIMMING POOLS

**John M. Goettl, Phoenix, Ariz., assignor to George J. Ghiz, Phoenix, Ariz.**

**Filed Nov. 9, 1981, Ser. No. 319,686**
**Int. Cl.³ E04H *3/20*; B08B *3/02*; B05B *15/10***
**U.S. Cl. 4—490** **6 Claims**



**1.** In an intermittently activated water delivery assembly for cleaning a swimming pool, comprising:

a generally cylindrical housing in communication with a source of water under pressure, said housing being in open communication with the interior of said pool at a surface of the pool structure, and

a generally cylindrical hollow nozzle head rotatably mounted in said housing and being axially movable from an inactive, retracted position therein to an active position in which a portion of said head projects outside said housing within said pool when water under pressure is supplied to said housing;

the improvement comprising:

thickened wall regions diametrically and symmetrically disposed interiorly of the portion of said nozzle head projecting outside said housing, each of said wall regions having at least one nozzle passage formed therein, said nozzle passages being symmetrically disposed in said nozzle head and being constructed to deliver streams of water non-radially from said nozzle head across said surface of the pool structure for cleaning said surface.

**6.** In an intermittently activated water delivery assembly for cleaning a swimming pool, comprising:

a generally cylindrical housing in communication with a source of water under pressure, said housing being in open communication with the interior of said pool at a surface of the pool structure, and

a generally cylindrical hollow nozzle head rotatably

mounted in said housing and being axially movable from an inactive, retracted position therein to an active position in which a portion of said head projects outside said housing within said pool when water under pressure is supplied to said housing;

the improvement comprising:

a retainer ring threadably received in said housing for determining the active position of said housing, and means are provided for releasable connecting said nozzle head and said retainer ring for joint removal from said housing, said last named means comprising a stop collar carried by said nozzle head and engageable with said retainer ring for limiting movement of said nozzle head to its active position and a holding ring formed on said nozzle head, said holding ring having a diameter slightly greater than the inside diameter of said retainer ring whereby said retainer ring may be forced over said holding ring to assemble said retainer ring and said nozzle head but interference between the holding ring and said retainer ring prevents accidental separation of the nozzle head and the retainer ring when the retainer ring is removed from the housing.

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**4,391,006**

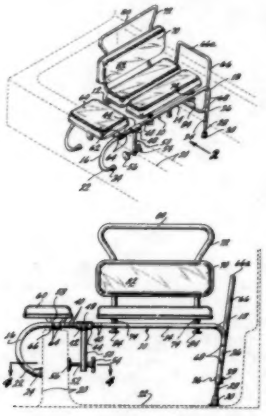
## TRANSFER BENCH

**Alfred A. Smith, 13114 Margate St., Van Nuys, Calif. 91401**

**Filed May 17, 1982, Ser. No. 379,077**

**Int. Cl.³ A47K** *3/00, 3/02, 3/022, 3/22*

**U.S. Cl. 4—559** **6 Claims**



**1.** A transfer bench to facilitate the movement of an infirm person or invalid from outside of a bathtub to a position at least partially within the bathtub, said bathtub being defined by a transverse floor and a wall extending upwardly from said floor to terminate in a rim, said transfer bench comprising:

A. a pair of parallel bar members spaced from each other, each of said bar members including a horizontal support section, having

(i) a first end portion to be disposed transversely upon the rim of the tub side wall and to extend outside of the tub and downwardly and back to terminate in abutment against the outside of the tub side wall, the horizontal support section adjacent said first end portion of one of said bar members being held in spaced parallel relationship with the corresponding horizontal support section of the other bar member by a rigid cushioning element secured to and extending over both said horizontal support sections; and

(ii) a second opposite end portion curved downwardly and extending vertically as a leg to terminate upon the transverse floor of the tub, the last said end portion of each of said bar members being secured in spaced relation to the corresponding end portion of the other bar member by a frame securable to and extending upwardly from each of said second end portions, said frame being spaced from said rigid cushion element by at least the width of a seat;

B. clamping means whereby the bench may be clamped to said tub side wall, said means comprising an element adjustably securable to, and extending downwardly from, the horizontal support section of each of said parallel bar members in proximity to its first end portion, the lower end of said adjustably securable element carrying a threaded member extending through said lower end with a first end directed toward the terminus of the first end portion of the bar member which abuts the outside of said tub side wall, said threaded member having knob means on its other end to enable the said first end of the threaded member to be adjustably moved toward or away from the inside of the tub side wall, and means disposed on said first end to distribute force, applied by the torquing of said threaded element by the knob means, over a broad area of the inner wall of the tub when said tub wall is clamped between the said means disposed on the first end of the threaded member and the terminus of the first end portion of horizontal support section of the parallel bar member, in abutment with the outside of the tub wall; and

C. cushioned seating means, the last said means extending across and fixedly secured to the horizontal support section of each of said parallel bar members intermediate said frame and said rigid cushioning element.

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**4,391,007**

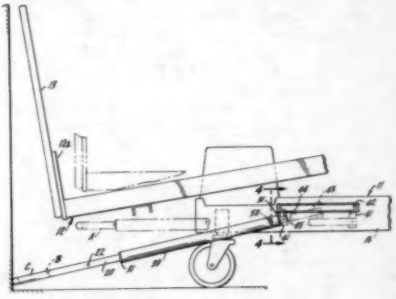
## MULTI-POSITION WALL SPACER

**Larry D. Mitchell, and Charles W. Keith, Jr., both of Manchester, Mo., assignors to B-W Health Products, Inc., Maryland Heights, Mo.**

**Filed Jan. 5, 1981, Ser. No. 222,415**

**Int. Cl.³ A61G** *7/00*

**U.S. Cl. 5—60** **13 Claims**



**1.** An adjustable hospital bed having a relatively fixed frame having side rails and head and foot portions, a movable frame having a headboard mounted thereon, and having head and foot portions, said bed having a normal position wherein said headboard is substantially parallel with an adjacent wall of a hospital room, elevation linkage interconnecting said movable frame with said fixed frame to elevate said movable frame, said linkage also being adapted to elevate the head portion of said movable frame into a reverse Trendelenberg tilt position, and operable to elevate the foot portion of the movable frame into a Trendelenberg tilt position, and an adjustable wall spacer attached through pivot means to said adjustable frame, said wall spacer comprising:

pivot means;

two tubes having guide bushings provided therein, each of

said tubes attached through said pivot means to one of said side rails;

a U-shaped tube having two legs, each of said legs slidably received by said guide bushings;

two tenons, each attached to one leg of said U-shaped tube; and

two U-shaped strike members, each attached to one of said side rails and each having an aperture in the top thereof and an aperture and an elongated notch in the bottom thereof, said strike members each positioned to receive a tenon selectively within either of said apertures.

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**4,391,008**

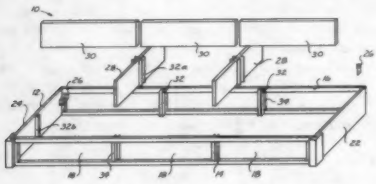
**ELEMENTS FOR ASSEMBLY OF KNOCKED-DOWN WATERBED PEDESTAL**

**Don N. Yamaoka, and David L. Yamaoka, both of 13599 Desmond, Pacoima, Calif. 91331**

**Continuation-in-part of Ser. No. 173,666, Jul. 29, 1980, abandoned. This application Mar. 16, 1981, Ser. No. 243,844**

**Int. Cl.³ A47C *19/00***

**U.S. Cl. 5—200 R** **3 Claims**



1. A drawer usable in a waterbed pedestal, comprising in combination:

(a) a front section, having dovetailed slots at its respective ends and a groove extending continuously horizontal along its lower portion;

(b) side sections, the front ends of which dovetails, fitting tightly into the slots of the front section, and grooves extending continuously horizontal along the lower portions thereof, the rear ends of the side sections being provided, respectively, with dovetail slots;

(c) a bottom section fitting slidingly into the grooves of the front and side sections;

(d) a back section, the ends of which have undersized dovetails fitting loosely within the dovetail slots of the rear end portions of the side sections, respectively, so as to create an elongated tapered cavity therewithin;

(e) elongated insert means adapted, respectively to be pressure fitted within the cavity in the dovetail joints of the end portions of the back and side sections, so as to establish rigid joining of the back and side section of the drawers, respectively.

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**4,391,009**

**VENTILATED BODY SUPPORT**

**Rolf Schild; Denis G. Melrose, both of London, and Brian M. Hawkins, Luton, all of England, assignors to Huntleigh Medical Ltd., Bedfordshire, England**

**Filed Oct. 17, 1980, Ser. No. 198,111**

**Int. Cl.³ A61G *7/04*; A47C *27/10***

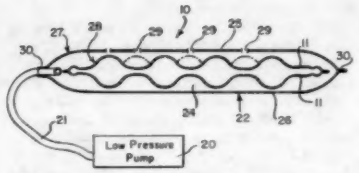
**U.S. Cl. 5—453** **13 Claims**

1. A ventilated support for living bodies comprising:

a plenum chamber having a plurality of apertures for communication with the environment;

first pump means coupled to said plenum chamber for providing passage of air through said plenum chamber at a relatively low pressure;

alternating inflatable support means disposed in operative relationship to said plenum chamber and having a first set of aligned bubblelike cells which are interdigitated with a second set of aligned bubblelike cells for giving sole support to said living body; and




second pump means coupled to said alternating inflatable support means for alternately inflating at a relatively high pressure said first and second interdigitated sets of aligned bubblelike cells.

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**4,391,010**

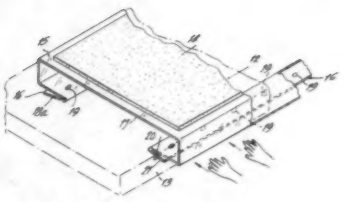
**DISPOSABLE DRAW SHEET**

**Albert F. Kronman, Locust Valley, N.Y., assignor to Hosposable Products Inc., Bound Brook, N.J.**

**Filed Aug. 18, 1981, Ser. No. 293,864**

**Int. Cl.³ A47G *9/00*; A61G *12/00***

**U.S. Cl. 5—484** **8 Claims**



1. A disposable draw sheet for application to the mattress of a bed comprising a thin sheet of liquid impervious material, a top surface, a bottom surface, longitudinal margins on said sheet and a sheet width substantially greater than that of the mattress to which it is to be applied so that said sheet margins may be tucked under said mattress on opposite sides thereof, a layer of liquid absorbent material carried by the top surface of the sheet across the midregion of said sheet, said absorbent material being of a width less than the top of the mattress, a doubled back portion on the longitudinal margins of the sheet, and means to secure the doubled back portion of the said margins to the top surface of the said sheet in at least two spaced discrete areas to form at least one pocket in each of the doubled back portions.

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**4,391,011**

**MACHINE ADAPTED FOR USE IN THE MANUFACTURE OF SHOES**

**Alan M. Peck, Beverly, Mass.; Kingsley J. Tutt, Birstall, and Andrew G. N. Walter, Quorn, both of England, assignors to USM Corporation, Farmington, Conn.**

**Filed Jun. 8, 1981, Ser. No. 271,585**

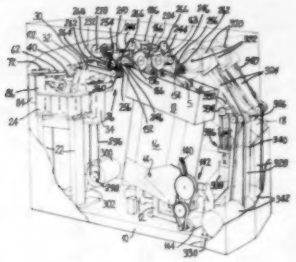
**Claims priority, application United Kingdom, Jun. 10, 1980, 8019008**

**Int. Cl.³ C14B *1/44***

**U.S. Cl. 12—1 B** **11 Claims**

1. A machine suitable for performing a roughing operation progressively along marginal portions of shoe bottoms comprising a shoe support, tool supporting means, means for effecting relative movement, lengthwise of the bottom of a shoe supported by the shoe support, between said shoe support and

the tool supporting means first in one direction and then in an opposite direction, and means, operable as relative lengthwise movement takes place as aforesaid, for effecting relative movement, widthwise of the bottom of a shoe supported by the shoe support, between said shoe support and the tool supporting means, whereby, in the operation of the machine, a roughing operation can be progressively performed along marginal portions of such shoe bottom, wherein the tool supporting means is arranged to support two roughing tools side-by-side for operating along opposite marginal portions of the shoe



bottom, the arrangement being such that each tool is caused to effect an in-wiping action on the marginal portion on which it is caused to operate, and further wherein, in a cycle of operation of the machine, a left-hand one of said tools is caused to operate along the marginal portion of the shoe bottom at the right-hand side thereof during relative lengthwise movement as aforesaid in said one direction, and the right-hand one of said tools is caused to operate along the marginal portion of such shoe bottom at the left-hand side thereof during said relative lengthwise movement in said opposite direction.

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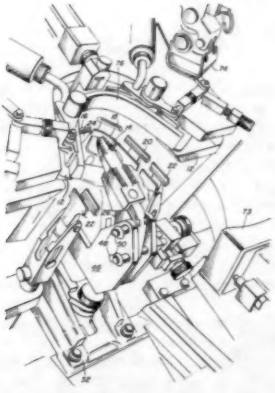
**4,391,012**

## SWINGABLE INSOLE REST

**Michael M. Becka, Nashua, N.H., assignor to International Shoe Machine Corporation, Nashua, N.H.**

**Filed Jun. 2, 1981, Ser. No. 269,447**
**Int. Cl.³ A43D** *21/00, 3/00*
**U.S. Cl. 12—10.5** **4 Claims**



**1.** A machine, operable on a shoe assembly formed of a last having an upper draped thereon and an insole located on its bottom, for stretching the vamp of the upper about the last and wiping the vamp of the upper margin against the insole comprising: an insole rest mounted for heightwise movement between a lower position and an upper position; a plurality of pincers extending about the insole rest, each pincers having a pair of jaws movable between open and closed positions; wiping means, mounted for forward and inward movement, extending outwardly about the insole rest; means for initially maintaining the insole rest in its lower position wherein the top of the insole rest is below the top of the wiping means with the shoe assembly so supported on the insole rest that the toe end of the shoe assembly faces rearwardly; means for initially maintaining all of the pincers jaws in their open positions; means for thereafter causing all of the pincers jaws to move to their closed positions to thereby grip the vamp of the upper margin; means for thereafter effecting rising movement to the insole rest to its upper position wherein the top of the insole rest is substantially at the level of the top of the wiping means to thereby enable the vamp of the upper to be stretched about the vamp of the last; means for thereafter imparting forward and inward movement, in a wiping stroke, to the wiping means to cause the wiping means to wipe the vamp of the upper margin against the insole; and means for causing all of the pincers jaws to move to their open positions and release the gripped vamp of the upper margin prior to the completion of the wiping stroke; characterized in that the machine comprises: means mounting the insole rest for heightwise swinging movement, about a prone axis that is located rearwardly of the insole rest, between an inclined position wherein the insole rest top is inclined rearwardly and upwardly and a prone position wherein the insole rest top is substantially parallel to the top of the wiping means; means for initially maintaining the insole rest in its inclined position when the insole rest is in its lower position; and means to effect such swinging movement to the insole rest about said axis that the insole rest is in its prone position when the insole rest is in its upper position.

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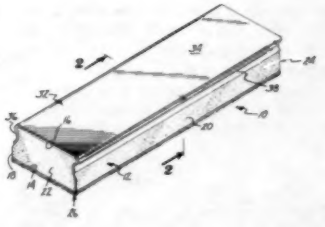
**4,391,013**

## FINISHING TOOL FOR SMOOTHING WALLBOARD TAPE JOINTS

**Craig R. Janssen, Arden Hills, Minn., assignor to Padco, Inc., Minneapolis, Minn.**

**Filed Feb. 9, 1981, Ser. No. 232,708**
**Int. Cl.³ A46B** *3/02, 11/00*
**U.S. Cl. 15—210 R** **14 Claims**



**1.** A tool for smoothing joints between adjacent wallboards, the joints having been prepared with a tape joint compound, the tool comprising:

a fluid retaining resilient foam pad having first and second major surfaces;

an adhesive layer bonded to and covering substantially all of the first major surface;

a wettable abrasive surface formed by a plurality of coarse, short, stiff synthetic polymer fibers oriented generally perpendicularly to the first major surface and bonded to the first major surface by the adhesive layer at first ends and having second free ends wherein the fibers are of a thickness of about 100 Denier and a length of not more than about 0.100 inch so that when the free ends are placed in moving abrasive contact with the wetted tape

joint compound, the wetted compound is smoothed flush with the adjacent wallboards as a result of moving abrasive action of the free ends.

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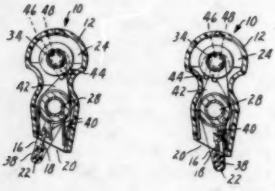
**4,391,014**

## CLEANING WIPER

**James F. Pitzen, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.**

**Filed Oct. 13, 1981, Ser. No. 311,055**
**Int. Cl.³ A47L *13/46, 13/256***
**U.S. Cl. 15—231** **8 Claims**



1. A cleaning wiper adapted to hold a roll of cleaning web, comprising:

a body having a slot along one side thereof;

a support member movably mounted within said body, a portion of which is accessible through said slot;

a supply holder mounted in said body adapted to hold said roll of said cleaning web;

a take-up holder mounted in said body adapted to hold a take-up roll for said cleaning web;

said cleaning web when intermediate said supply roll and said take-up roll passing over said portion of said support member forming a cleaning surface;

said support member being resiliently biased within said slot; and

an advance linkage activated by movement of said support member within said slot and coupled to said take-up holder for advancing the rotation of said take-up holder a predetermined amount;

whereby said cleaning surface maintains a fresh portion of said cleaning web by automatically advancing said cleaning web as said cleaning wiper is utilized.

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**4,391,015**

## PIVOT CONNECTION FOR WIPER BLADES

**Johan H. van den Berg, Hasselt, Belgium, assignor to Champion Spark Plug Europe S.A., Binche, Belgium**

**Filed Oct. 22, 1981, Ser. No. 313,639**
**Claims priority, application France, Oct. 27, 1980, 80 22923**
**Int. Cl.³ B60S *1/38***
**U.S. Cl. 15—250.42** **9 Claims**

1. A pivot connection for two yokes (1,2,1ª) of a wiper blade wherein the cross-section of a first metallic yoke (1) has substantially the form of an inverted U comprising a web and two flanges and further comprising at its two extremities, as well as in its central portion, a transverse pivot pin extending between said flanges (6,5) and wherein a second yoke (2,10) comprises attaching means (11,15,16) capable of cooperating with one or the other of said pivot pins (6,5), characterized in that the two pivot pins (6) at the extremities of the first yoke (1) are formed

from a tongue (14) cut in the web (4) of said yoke (1) and rolled to form a tubular pivot.

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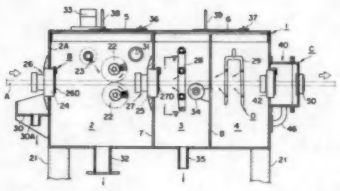
**4,391,016**

## DEGREASING APPARATUS FOR ELONGATED MATERIALS

**Teruaki Kawamura; Nobuhiko Harada; Yukihiko Komatsu, and Masaru Sakai, all of Shimonoseki, Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan**

**Filed Sep. 14, 1981, Ser. No. 302,135**
**Claims priority, application Japan, Oct. 14, 1980, 55-146429[U]**
**Int. Cl.³ B21B *45/02***
**U.S. Cl. 15—302** **11 Claims**



1. A degreasing apparatus for degreasing an elongated member comprising:

a treatment room having a plurality of chambers sequentially divided in an isolated fashion along a feeding direction of the elongated member wherein said plurality of chambers comprise a degreasing chamber, a predrying chamber and a finish drying chamber;

at least one pair of rotary brushes provided in the degreasing chamber such that said brushes are maintained in contact with an outer surface portion of the elongated member;

means disposed in the degreasing chamber for jetting out a degreasing liquid in a direction toward the inlet side of a contact area between said brushes and said elongated member;

a plurality of degreasing members provided, respectively, at the inlet and outlet sides of the degreasing chamber along an axis on which the elongated material is fed, wherein each of said degreasing members comprises an elastic material and defines an opening for permitting said elongated member to forceably pass therethrough;

means disposed in said predrying chamber for jetting out water or steam against the elongated material; and

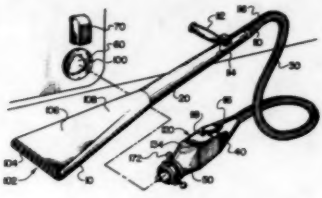
means mounted in said finish drying chamber for jetting out a drying medium of hot air against the elongated member.

**4,391,017**

## DEVICE FOR REMOVING INCENDIARY MATTER FROM THE INTERIOR OF AN AIRCRAFT

**Wilhelm A. Bruensicke, Santa Monica, Calif., assignor to Lockheed Corporation, Burbank, Calif.**

**Filed Dec. 28, 1981, Ser. No. 335,178**
**Int. Cl.³ A47L** *5/18, 5/38*
**U.S. Cl. 15—313** **9 Claims**



1. A device for disposing of flammable fluids and other incendiary material from the pressurized interior of an aircraft comprising:

an intake nozzle;

an intermediate wand portion having a longitudinal bore extending therethrough, said bore being in fluid communication with said nozzle;

a flexible hose connected at the end of said intermediate wand portion bore remote from said intake nozzle;

a quick connect fitting at the other end of said flexible hose and in fluid communication therewith;

an outlet fitting adapted for forming a flow path for fluid communication with said quick connect fitting, said outlet fitting comprising

a plug which when removed results in said outlet fitting being in fluid communication with the external airstream and

means for removing said plug by ejecting it into said external airstream.

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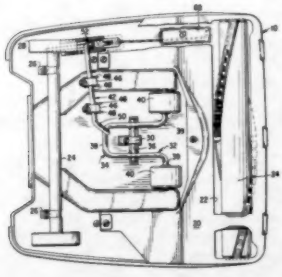
**4,391,018**

## VACUUM CLEANER WITH WHEEL AND NOZZLE HEIGHT ADJUSTING MECHANISM

**Don W. Vermillion; Francis S. Gromek, both of Anderson, S.C., and Scott S. Bair, III, Atlanta, Ga., assignors to The Singer Company, Stamford, Conn.**

**Filed Mar. 13, 1981, Ser. No. 243,413**
**Int. Cl.³ A47L** *5/34*
**U.S. Cl. 15—339** **5 Claims**



1. In a suction cleaner having a chassis including a front suction nozzle inlet at the bottom thereof and rear and front sets of wheels supporting such chassis for movement on a floor surface, a nozzle height adjusting mechanism comprising rear axle means including a rear axle carried by said chassis for rotatably supporting said rear set of wheels, front axle means including a central portion having a pintle shaft mounted therewith and with the chassis for enabling rocking movement of said front axle means relative said chassis, said front axle means including an actuating portion extending rearwardly from said pintle shaft and a pair of offset arms forwardly of and formed on an opposite side of said pintle shaft extending laterally outwardly thereof for journaling said front set of wheels, said offset arms being longitudinally spaced from said rear axle means, means for adjusting the position of said front wheels relative said chassis, said adjusting means including an adjustment lever journaled on said chassis adjacent said rear axle with a journaled portion thereof substantially parallel thereto and having one end angulated to engage said actuating portion so that rocking movement of said adjustment lever rocks said front axle means about said pintle shaft and thereby raises or lowers said front set of wheels relative said chassis, an operator engageable means for cooperating with a second end of said adjustment lever and extending upwardly through said chassis to a position accessible by an operator from an operating position for said suction cleaner for engagement by the foot of said operator to adjust nozzle height as said operator engageble means is rocked in a front to back direction thereby.

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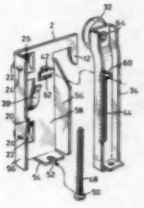
**4,391,019**

## CORNER CONNECTOR FOR SLIDING DOORS

**Peter B. Downes, Oakville, Canada, assignor to DSH, Concord, Canada**

**Filed Feb. 27, 1981, Ser. No. 239,147**
**Int. Cl.³ A47H** *15/00;* **E05D** *13/02*
**U.S. Cl. 16—105** **7 Claims**



1. In a corner connector for a sliding door slidable along top and bottom tracks, said connector comprising a rigid connector member for locking engagement with a vertical stile and a horizontal rail of such a door whereby to hold them together, and an elongated arm movable vertically within said connector member whereby to control the extension of the distal end of said arm beyond the connector member, said distal end having a track engaging guide member, the connector member being a one-piece stamping formed from metal sheet, the general plane of which is located when in use in a vertical plane behind and parallel to a panel of the door, said connector member including a portion at one vertical margin bent rearwardly out of the general plane of the sheet and configured for locking engagement with the stile and a portion at an opposite vertical margin configured for engagement with a slot in the rail, the arm being supported for vertical sliding movement in contact with the rear surface of the sheet, the improvement wherein the arm is separable from the connector member, and is normally guided longitudinally and retained in contact with the rear surface of the sheet solely by a plurality of portions of the sheet struck rearwardly out of the plane of the sheet and presenting guiding and retaining surfaces to the arm which restrict it to vertical sliding movement in contact with the rear surface of the connector throughout its normal range of movement, the rearwardly struck portions being so located and configured relative to the location and configuration of the arm that the latter can be disengaged therefrom but only when moved

vertically to a position beyond one end of its normal range of movement.

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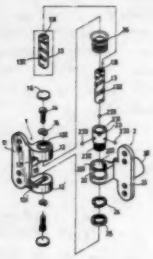
4,391,020

## GRAVITY RETURN HINGE HAVING AN AXLE ROD IN AN AXLE SLEEVE

Yun-Tung Hsu, Taipei, Taiwan, assignor to Pei-Liang Chiu, Taipei, Taiwan

Filed Jun. 3, 1981, Ser. No. 270,213
Int. Cl.[3] E05F *1/04*
U.S. Cl. 16—314 5 Claims



1. An automatic return hinge comprising one primary hinge and one secondary hinge, and said primary hinge including a left side primary hinge piece to be attached to a suitable upper portion of the jamb, and a right side primary hinge piece to be attached to a suitable upper portion of the door, and a locating piece of said right side primary hinge piece being furnished with a sleeve in which an axle sleeve being fitted, and around said axle sleeve, three locating balls being mounted at an equal distance of 120° angle, and in said axle sleeve fitting an axle rod with three slantingly upwards spiral grooves separated at an equal distance of 120° angle so as to match said three locating balls; and at one side of a locating piece of the left side primary hinge piece, having two axle seats with locating grooves in corresponding position; and when the sleeve of said right side primary hinge piece being placed in between the two axle seats of the left side primary hinge piece, the flat ends of the axle rod then being inserted into said locating grooves, and being fixed with screws; and when opening the door moving upwards slightly as a result of the matching function of said spiral grooves and said locating balls, and upon the door opening being over, the door automatically returning to shutting position as a result of door gravity effect.

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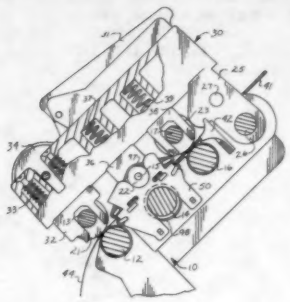
4,391,021

## APRON DRAFTING SYSTEM

Fouad A. Kamel, Pineville, N.C., assignor to Whitin Roberts Company, Charlotte, N.C.

Filed Oct. 19, 1981, Ser. No. 313,318
Int. Cl.[3] D01H *5/86*
U.S. Cl. 19—253 23 Claims

1. A drafting apparatus for textile fibers comprising a pair of back rolls, a pair of middle rolls, and a pair of front rolls, each of said pairs of rolls including a top roll and a bottom roll, a cradle supported on said middle rolls and including a pair of side plates, a top apron extending around said top middle roll between said side plates, a bottom apron extending around said bottom middle roll between said side plates, said cradle including a pair of front apron pins in the front drafting zone between said front and middle rolls, said cradle including a pair of back apron pins in the back drafting zone between said back and middle rolls, said top apron extending around the top ones of said front and back apron pins, said bottom apron extending around the bottom ones of said front and back apron pins, whereby said top and bottom aprons extend in confronting relationship from said back apron pins through the nip between



said middle rolls and to said front apron pins to control the textile fibers in abutting contact in both the back and front drafting zones.

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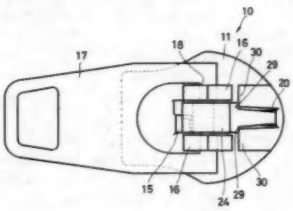
4,391,022

## AUTOMATIC LOCK SLIDER FOR SLIDE FASTENERS

Kiyoshi Oda, Namerikawa, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Mar. 2, 1981, Ser. No. 239,573
Claims priority, application Japan, Mar. 4, 1980, 55-28108[U]; Mar. 4, 1980, 55-28109[U]
Int. Cl.[3] A44B *19/00*
U.S. Cl. 24—205.14 R 8 Claims



1. An automatically locking slider for a slide fastener having a pair of coupling element rows, said slider comprising:

(a) a slider body including a pair of first and second wings joined at one end by a neck, there being defined a Y-shaped guide channel between said wings for the passage of the pair of coupling element rows of the slider fastener, said first wing having an aperture communicating with said guide channel, said neck having a projecting locking-member retaining nose adjacent to said second wing;

(b) a pair of laterally spaced lugs on said first wing, one on each side of said aperture;

(c) a pull tab pivotably connected to said lugs and having a transverse spindle journalled thereby in a fixed axis; and

(d) a locking member pivotably supported on said slider body and including a resilient strip having

(1) a U-shaped base extending around said transverse spindle and normally urged thereagainst by the resilience of said strip, said base being angularly movable away from said first wing in response to the pivotal movement of said pull tab against the bias of said strip,

(2) an anchor extending from one end of said base and terminating in a hook-shaped end hooked with said retaining nose, said hook-shaped end being urged against said nose by the resilience of said strip and

thereby prevented from being unhooked from said nose, and

(3) a locking prong extending from the other end of said base for normally projecting into said guide channel through said aperture to lockingly engage with the pair of coupling element rows, said locking prong being retractable, from said guide channel into said aperture, in response to the angular movement of said base away from said first wing.

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## 4,391,023
## BUCKLE ARRANGEMENT FOR SEAT BELTS

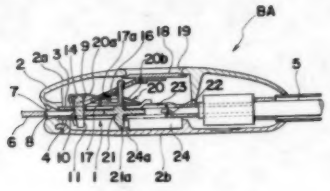
**Kobun Tanaka, Nagoya, and Takashi Kawaharazaki, Toyoake, both of Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan**

**Filed Jan. 19, 1981, Ser. No. 226,474**

**Claims priority, application Japan, Jan. 23, 1980, 55-6788[U]**

**Int. Cl.³ A44B *11/26***

**U.S. Cl. 24—230 AL** **4 Claims**




1. A buckle arrangement for a seat belt comprising:

a frame member;

a tongue portion having an inserting end, insertable into said frame member in an insertion direction and withdrawable from said frame member in a withdrawal direction;

a locking member having contact portions, movably disposed on said frame member for movement into a locking position in which said tongue portion is locked in said frame member upon insertion of said tongue portion into said frame member, and for movement from said locking position in a direction of unlocking to unlock said tongue portion from said frame member; said tongue portion having engaging means, formed at said inserting end, for selective engagement of said tongue portion with and disengagement of said tongue portion form said locking member;

means for moving said locking member form said locking position in said direction of unlocking; and

a retaining plate having a plate-like surface, provided on said frame member for retaining said locking member in said locking position, said retaining plate having portions inclined to said plate-like surface for contact with said contact portions of said locking member, such that said retaining plate exerts a component force in said withdrawal direction on said tongue portion.

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## 4,391,024
## BUCKLE DEVICE

**Masaru Morinaga, Yamato, Japan, assignor to NSK-Warner K.K., Tokyo, Japan**

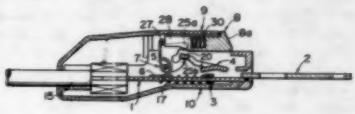
**Filed Mar. 24, 1981, Ser. No. 247,148**

**Claims priority, application Japan, Apr. 10, 1980, 55-47613[U]**

**Int. Cl.³ A44B *11/25***

**U.S. Cl. 24—230 A** **8 Claims**

1. A buckle device for latching to a tongue, comprising a base, a latch member supported on said base so as to be movable between an engaged position with said tongue and a non-engaged position with said tongue, a push button member for releasing the engagement between said tongue and said latch member when manually operated, and a lever member pivotally supported on said base and having a first portion adapted to be engaged by said push button member when the push button member is manually operated, a second portion adapted to engage said latch member so as to bring said latch member into said engaged position and to hold said latch member in such position, a third portion adapted to engage said latch member when said push button member is manually operated to bring said latch member from said engaged position into said non-engaged position, the latch member being held loosely




between said second and third portions, and a spring portion for imparting a biasing force to the lever member in a direction in which said second portion is engaged with said latch member, said lever member being adapted, when said push button member is operated with said tongue and said latch member being engaged with each other, to receive a rotational force applied to said first portion and to transmit said rotational force to said latch member through said third portion to thereby bring said latch member from said engaged position into said non-engaged position.

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## 4,391,025
## PROCESS FOR LAYING DOWN CONTINUOUS MATERIAL

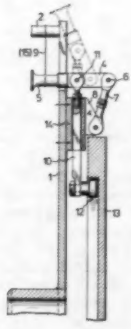
**Frank R. Mehdorn, Steppach, and Johann Seelig, Schwabmünchen, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Aug. 18, 1980, Ser. No. 178,740**

**Claims priority, application Fed. Rep. of Germany, Aug. 22, 1979, 2933963**

**Int. Cl.³ B65H *54/80***

**U.S. Cl. 28—289** **1 Claim**




1. An apparatus for forming meanders in a continuous spinning tow running in a plane comprising a single rotating wheel and meander-forming and -releasing means comprising:

reversing elements (2) arranged generally in a circle on the surface and around the periphery of the wheel (1) and, between each pair of reversing elements (2), a guide groove (3) in wheeel (1) for guiding a catching device (5);

movable catching devices (5), each catching device (5) arranged on a fork (4) sliding in a guide groove (3), and mechanical actuating means for the catching devices (5), each catching device (5) having an initial position, outside of the plane in which the continuous spinning tow is running and in closely spaced relation to the periphery of

the wheel, and being movable from this initial position radially inwardly toward the axis of the wheel and into said plane; each fork (4) being fastened to the wheel (1) via a first joint (6), a connecting rod (7), and a pillow block (8);

said mechanical actuating means including means for:

sequentially moving the catching devices (5) to a relatively radially inward position from their initial position while also moving the catching devices into the plane in which the spinning tow is running thereby catching the spinning tow and forming a first meander of a sequential series of meanders in said spinning tow, each meander extending from a reversing element (2) to a catching device (5) which is in the relatively radially inward position, and

moving each catching device (5) back toward its initial position after the catching device has rotated more than 60° of the circumference of the wheel (1), thereby releasing the meander;

the actuating means for each catching device (5) including a slide rod (10) for driving each fork (4) via a second joint (11); the slide rod (10) sliding in a corresponding track (14), and the motion cycle of the slide rod (10) being determined by a cam disk (13) via a cam roller (12).

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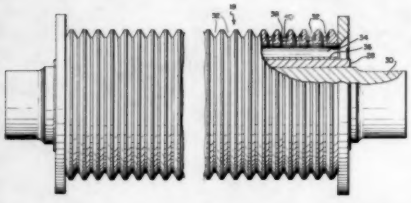
**4,391,026**

## MILL ROLL

**John A. Casey, San Francisco, and Joseph C. V. Ducasse, Martinez, both of Calif., assignors to Fabcon Incorporated, San Francisco, Calif.**

**Filed Mar. 19, 1981, Ser. No. 245,689**
**Int. Cl.³ B21B *27/02***
**U.S. Cl. 29—121.6** **6 Claims**



1. A mill roll for use in grinding material such as sugar cane and for extracting juice therefrom, said mill roll comprising:

a roll body;

a plurality of circumferentially extending grooves formed in the periphery of said roll body, each said circumferentially extending groove comprising a substantially V-shaped groove defined by a pair of facing flank surfaces which converge radially of said roll body;

a plurality of channels extending axially through said roll body at positions inwardly of said grooves;

a plurality of radially extending recesses formed at locations spaced circumferentially around each said groove, each said recess being formed in at least portions of said facing flank surfaces of the respective said groove, and each said recess extending inwardly of the bottom of said respective groove;

a plurality of inserts, each said insert being fitted within a respective said recess, and each said insert being secured in the respective said recess by welds filling-in portions of said recess in said facing flank surfaces and reforming said flank surfaces;

each said insert having extending substantially radially therethrough an opening connecting the respective said groove with a respective said channel, each said opening having an elongated, substantially rectangular circumferential cross-section with a longer dimension extending substantially circumferentially of said roll body and a narrower dimension extending axially of said roll body; and

said welds covering substantially the entire radial outer surface of the respective said insert, except for said opening therethrough, such that said welds protect the radially outer edges of said opening.

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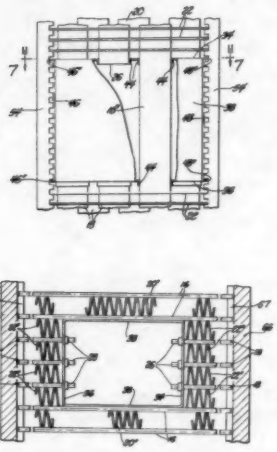
**4,391,027**

## METHOD OF MAKING A HEAT EXCHANGER ASSEMBLY

**James C. Fleury, Ora, Ind., assignor to Ex-Cell-O Corporation, Troy, Mich.**

**Division of Ser. No. 104,588, Dec. 17, 1979, Pat. No. 4,296,805.**
**This application Jun. 5, 1981, Ser. No. 270,602**
**Int. Cl.³ B23P *15/26***
**U.S. Cl. 29—157.3 B** **10 Claims**



1. A method of making a heat exchanger assembly of the type having a core with front and rear faces with a plurality of tubes parallel to the faces and a plurality of fins extending transversely to the faces and tubes respectively and interconnecting the tubes, comprising the steps of; assembling the fins and tubes together and with a peripheral wall extending between the front and rear faces to define oppositely facing openings adjacent the faces and including perforated top and bottom walls interconnected by side walls inserting a first group of tubes through the perforations in the top and bottom walls so as to extend between the top and bottom walls, removing the lengths of the first group of tubes extending between the top and bottom walls, and closing the oppositely facing openings of the peripheral wall with closure members.

9. A method of making a heat exchanger assembly of the type having a core with front and rear faces with a plurality of fins extending transversely to the faces and tubes respectively and interconnecting the tubes comprising the steps of; providing tube nesting members each having a notch extending along the longitudinal axis of said tube nesting member, arranging said tube nesting members so that said notches are oriented vertically and disposing said tube nesting members a horizontal distance apart approximately the distance between the top and bottom of the core, disposing a first group of vertically spaced horizontal tubes between the tube nesting members and within the notches, disposing horizontal lengths of serpentine fin extending between the tube nesting members and engaging adjacently spaced rows of tubes, disposing a peripheral wall extending between the front and rear faces of the core to define

oppositely facing openings adjacent the faces and including perforated top and bottom walls interconnected by side walls between the tube nesting members, disposing a second group of tubes to extend between and within each nesting member and the perforations in one of the top and bottom walls, closing the oppositely facing openings of the peripheral wall with closure members, removing the tube nesting members, and securing the tubes, fins and peripheral wall together to form the heat exchanger.

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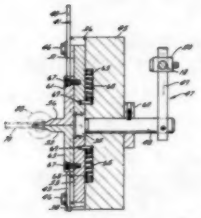
**4,391,028**

## SOLVENTLESS ASSEMBLY OF FLEXIBLE TUBING TO A COMPONENT

**Hrishikesh Choudhury, Gurnee, Ill., and Juergen H. Zaha, Moore, S.C., assignors to Abbott Laboratories, North Chicago, Ill.**

**Filed Oct. 26, 1981, Ser. No. 315,076**
**Int. Cl.³ B23P *19/00*; B29C *17/00, 25/00***
**U.S. Cl. 29—235** **10 Claims**



1. An assembly apparatus for securing a length of flexible tubing having a predetermined internal diameter to a tubular portion having an external diameter larger than said predetermined internal diameter comprising:

a multiplicity of jaw members each having a longitudinal portion dimensioned to fit within said length of flexible tubing;

means to radially guide said jaw members from a closed position to a position spaced therefrom while maintaining a parallel relationship with respect to the jaw members;

means operatively associated with said jaw members to move said jaw members from said closed position to said spaced apart position; and

means positioned adjacent said jaw members to introduce a cooling media having a temperature to temporarily freeze said length of tubing in an expanded state when contacted with said jaws in said spaced apart position.

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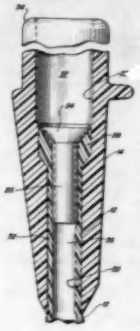
**4,391,029**

## CATHETER HUB ASSEMBLY

**Leonard F. Czuba, Lombard, and Dean G. Laurin, Lake Zurich, both of Ill., assignors to Baxter Travenol Laboratories Inc., Deerfield, Ill.**

**Division of Ser. No. 970,609, Dec. 18, 1978, abandoned. This application Apr. 24, 1980, Ser. No. 143,072**
**Int. Cl.³ B23P *11/02*; B29C *13/00***
**U.S. Cl. 29—450** **3 Claims**

1. The method of forming an end having a plurality of areas of increasing wall thickness on a heat recoverable stressed thermoplastic tubular catheter, which comprises: heating the end of the tubular catheter to cause it to spontaneously reduce its length and increase its wall thickness and inner diameter as stresses are relieved in the heated portion of said catheter, while not exposing the remainder of said catheter to heat, and thereafter pressing the end of said catheter at at least its softening temperature against a flat surface to form a thickened annular lip about the catheter end.



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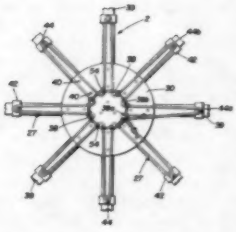
**4,391,030**

## METHOD OF PRODUCING A LOOPED STRAND LACING MEMBER FOR USE IN TRANSPLANTING TREES

**Barry Weidner, 153 E. Marion St., Doylestown, Wayne County, Ohio 44230**

**Division of Ser. No. 131,208, Mar. 17, 1980, Pat. No. 4,287,840. This application Jun. 29, 1981, Ser. No. 278,041**
**Int. Cl.³ B21D *39/00*; B23P *11/02***
**U.S. Cl. 29—509** **4 Claims**



1. A method of forming a looped-strand drum lacing member for use in transplanting trees, including the steps of:

(a) providing a wheel-like member having a central hub with a plurality of posts arranged in a circular manner on the hub, and having a plurality of outwardly radially extending legs with a peg mounted on each of the legs at a predetermined radial distance from the central hub posts;

(b) looping a first piece of flexible strand material in a repeating manner about one of the central hub posts and then outwardly along one of the legs and about the peg of said one leg and then inwardly and around a next post adjacent to said one post to form a closed end loop, and continuing said loop-forming procedure until a loop is formed along each of the legs;

(c) securing the first piece of strand material after completing the formation of the loops;

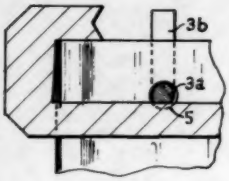
(d) weaving a second piece flexible strand material into a circular arrangement about the central hub posts; and

(e) securing together certain areas of the first and second pieces of stand material adjacent the central hub posts.

## 4,391,031
## METHOD OF ASSEMBLING TWO SHAPED SECTIONS WITH A COTTER

Yves D. Laugier, Toulouse, France, assignor to Technal International S.A., Toulouse, France

Filed Jul. 14, 1981, Ser. No. 283,344
Claims priority, application France, Jul. 21, 1980, 80 16083
Int. Cl.³ B23P *19/00*
U.S. Cl. 29—526 R 9 Claims




1. A method for assembling first and second shaped sections at substantially perpendicular directions comprising:

providing a first shaped section having a wall (1*a*), two flanges (1*b*, 1*c*), two bends (1*d*, 1*e*) and a slot formed in said wall, said slot having a configuration such as to receive said second shaped section therein,

providing at least one cotter (3) comprising a rod (3*a*) having a thinned segment formed on a portion of its periphery,

providing a second shaped section having a cross-sectional configuration complementary to said slot and at least one circular aperture for receiving a cotter, said aperture being positioned in said second shaped section such that when said second shaped section is inserted in said slot and abutted against said bends, said aperture extends beyond said first section a distance at least as great as the thickness of said cotter at said thinned segment and less than the thickness of said cotter at its unthinned segment,

inserting said second shaped section (2) into said slot (4) until its end (2*a*) abuts the bends (1*d*, 1*e*) of said first shaped section,

inserting said at least one cotter into said at least one aperture with said thinned segment against the wall of said first shaped section, and

rotating said at least one cotter about the longitudinal axis thereof for urging the unthinned portion thereof in compression against said wall.

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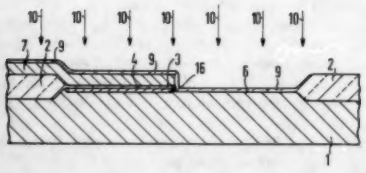
## 4,391,032
## METHOD FOR MANUFACTURING INTEGRATED DYNAMIC RAM ONE-TRANSISTOR STORAGE CELLS

Heinz Schulte, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 13, 1981, Ser. No. 282,706
Claims priority, application Fed. Rep. of Germany, Aug. 29, 1980, 3032632
Int. Cl.³ H01L *21/20;* B01J *17/00;* H01L *27/04*
U.S. Cl. 29—571 3 Claims




1. Method for manufacturing dynamic RAM one-transistor cells integrated in a semiconductor substrate, each cell consisting of one field-effect transistor and one storage capacitor, which comprises

(a) insulating areas of the semiconductor substrate for the one-transistor cells by thick oxide structures to insulate the cells from each other and covering the areas for the cells between the thick oxide structures with first thin oxide layers,

(b) forming an electrode for the storage capacitors by applying a first polycrystalline semiconductor layer over the entire surface of the thick oxide structures and the first thin oxide layers, and structuring by etching in the areas of the semiconductor substrate together with the first thin oxide layers, to leave remaining on the storage capacitor parts of the one-transistor cell areas of the semiconductor substrate a layer sequence of thin oxide as a capacitor dielectric and the polycrystalline layer as the capacitor electrode,

(c) applying a second thin oxide layer over the entire surface to form a gate oxide for the transistors,

(d) doping the transistor parts of the one-transistor cell areas of the semiconductor substrate by another ion implantation to adjust the cut-off voltage of the transistors,

(e) forming the gate electrodes of the transistors, by applying a second polycrystalline semiconductor layer over the entire surface and structuring by etching to leave parts of the second polycrystalline semiconductor on the transistor parts of the one-transistor cell areas, the combination therewith of

(f) adjusting the storage capacitors to a predetermined storage capacity after the thick oxide structures and the first thin oxide layers are formed, and using the thick oxide structures as a mask, subjecting the cell areas to an ion implantation for preparing a doped layer which with the semiconductor substrate forms a pn-junction in the storage capacitor parts in the semiconductor substrate, and

(g) performing said another ion implantation for adjusting the cut-off voltage of the transfer transistors utilizing as a mask the parts of the first polycrystalline semiconductor layer which form the electrode of the storage capacitors.

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## 4,391,033
## METHOD OF MAKING V-ISOLATION GROOVES BY OVER-FILLING WITH POLYCRYSTALLINE SILICON OF GRADED CONDUCTIVITY AND ETCHING

Satoshi Shinozaki, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jul. 21, 1981, Ser. No. 285,507
Claims priority, application Japan, Jul. 28, 1980, 55-103341; Dec. 12, 1980, 55-175292; Dec. 12, 1980, 55-175293; Mar. 5, 1981, 56-31602
Int. Cl.³ H01L *21/20, 21/306*
U.S. Cl. 29—576 W 20 Claims

1. A method of manufacturing a semiconductor circuit, comprising the steps of:

(a) forming a groove on one main surface of a semiconductor substrate such that an island region is defined by said groove;

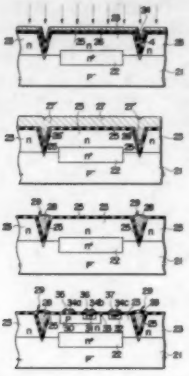
(b) oxidizing said main surface of the substrate including at least the surface of the groove;

(c) depositing a semiconductor layer in said groove and on the substrate surface adjacent said groove, said semiconductor layer being deposited to a depth greater than the depth of said groove so that at the location of said groove said semiconductor layer fills said groove and extends above the main surface of said substrate;

(d) introducing an impurity into said semiconductor layer whereby the impurity concentration of the semiconductor layer within the groove is substantially different than the impurity concentration of the semiconductor layer above and adjacent the groove; and

(e) selectively removing the semiconductor layer above and

adjacent the groove by utilizing the difference in impurity concentration so as to follow the semiconductor layer to



remain only within the groove and, thus, to provide a region for separating two adjacent island regions.

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**4,391,034**

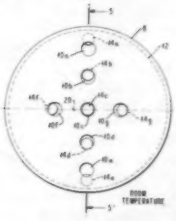
## THERMALLY COMPENSATED SHADOW MASK

**Kenneth P. Stuby, Catlett, Va., assignor to IBM Corporation, Armonk, N.Y.**

**Filed Dec. 22, 1980, Ser. No. 218,910**

**Int. Cl.³ H01L** *5/00, 7/10, 7/54*

**U.S. Cl. 29—579** **3 Claims**



3. A method for making an improved high temperature shadow mask assembly for a large diameter silicon wafer, comprising the steps of:

forming a planar plate having a pattern of apertures misregistered at room temperature but registered at high temperature during a deposition process, each of those respective distances from the centroid of said plate at room temperature is misregistered with respect to the corresponding desired distance from the centroid of said wafer of a corresponding shadow image on the silicon wafer at room temperature, by approximately the product of the difference between said high temperature and said room temperature times said desired distance times the difference between the thermal coefficient of expansion of the plate material and the thermal coefficient of expansion of the silicon wafer;

clamping said plate and said wafer with their said centroids mutually coincident, in a fixture which does not maintain their said centroids mutually coincident at said high temperature;

raising the temperature of said plate and silicon wafer to said high temperature for processing;

whereby the differential expansion of the plate material will bring the apertures therein into a minimum total misalignment with the intended deposition locations on the silicon wafer.

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**4,391,035**

## METHOD OF MOUNTING A MAGNETIC HEAD UNIT ON A MOVABLE CARRIER

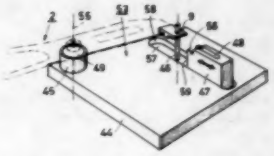
**Oelke Van de Bult, The Hague, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 24, 1981, Ser. No. 305,313**

**Claims priority, application Netherlands, Apr. 14, 1981, 8101824**

**Int. Cl.³ G11B** *5/42*

**U.S. Cl. 29—603** **4 Claims**



1. A method of mounting a magnetic head unit (6) on a carrying arm (3) of a movable carrier (2) of a magnetic disk storage device for digital data, which device comprises at least one rotating rigid magnetic disk (1) having a surface over which the magnetic head unit is moved for the storage and/or reproduction of the data in closely spaced tracks, and a bearing arrangement (29) which comprises bearing parts (31*a, b*; 32*a, b*) respectively connected to the movable carrier (2) and to a stationary frame (30) of the magnetic disk storage device, for accurately guiding the movements of the carrier (2) relative to the frame (30) and thereby guiding the movements of the magnetic head unit (6) over said surface of said magnetic disk (1) in an accurately defined plane, characterized in that the method comprises the following steps in the specified order:

a. manufacturing a fixing part (9) for the magnetic head unit (6), the part being provided with locating faces, recesses, projections and openings for subsequent positioning and fixing of the magnetic head unit;

b. arranging said carrying arm (3) and the fixing part (9) on a mounting aid (53) provided with first means (45) for positioning the carrying arm (3) relative to the mounting aid and second means (46, 47) for positioning the fixing part (9) relative to the mounting aid, the carrying arm 3 and the fixing part (9) assuming a relative position on the mounting aid (53) which is within the required positional tolerances of the finished product, but leaving a certain space between the fixing part (9) and the carrying arm (3);

c. filling said space, at least partly, with a bonding agent in liquid form, such as an adhesive or solder;

d. allowing the bonding agent to cure; thereby securing said fixing part and said carrying arm in said relative position determined in step b, and

e. securing the magnetic head unit to the fixing part.

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**4,391,036**

## PROCESS FOR PRODUCING SEALED LEAD-ACID BATTERY

**Kenjiro Kishimoto; Hideaki Igarashi, and Migaki Kono, all of Osaka, Japan, assignors to Yuasa Battery Company Limited, Takatsuki, Japan**

**Filed Jul. 31, 1981, Ser. No. 288,791**

**Int. Cl.³ H01M** *10/04*

**U.S. Cl. 29—623.2** **8 Claims**

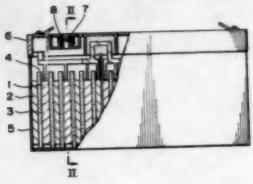
1. A process for producing a sealed lead-acid battery comprising the steps of

positioning a plate group in a container, the plate group being formed of positive and negative plates with separa-

tors therebetween, the separators being formed mostly of glass fibers having diameters of not more than 1.0 micron,

arranging a viscosity-increasing agent in the peripheral part of the plate group,

pouring a first sulfuric acid electrolyte into the container in an amount which is less than the total pore volume of the plate group,



pouring a second sulfuric acid electrolyte into the container in an amount such that the total amount of poured electrolyte is at least equal to the total pore volume of the plate group, and

sealing the container to form the sealed lead-acid battery.

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**4,391,037**

## APPARATUS FOR JOINING THIN METAL STRIPS END-TO-END

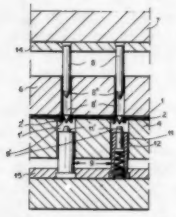
**Giovanni Giasini, Via Vespucci 24, Grassobbio, Bergamo, Italy**

**Filed Nov. 14, 1980, Ser. No. 207,079**

**Claims priority, application Italy, Nov. 16, 1979, 27349 A/79**

**Int. Cl.³ B23P *21/00*; B23Q *15/00***

**U.S. Cl. 29—716** **8 Claims**



1. An apparatus for joining thin metal strips end-to-end, comprising:

clamping means for relatively immobilizing two metal strips with extremities thereof overlapping but accessible from opposite sides;

a plurality of four-sided-cross-section piercing tools on the side of one of said strips operable to form as many throughgoing perforations with two pairs of parallel sides in said overlapping extremities, with punched-out metal from both strips extending through each perforation to form a double burr projecting through the other strip, each of said tools having a tip substantially in the form of a four-sided pyramid with outlines conforming to said perforations adapted to split said double burr into four separate double tabs of substantially triangular shape;

a support having a plurality of openings aligned with said piercing tools; and

a plurality of pushers on the side of said other strip disposed opposite said tools and operable to spread said double tabs and flatten same against the perforated extremity of said other strip.

**4,391,038**

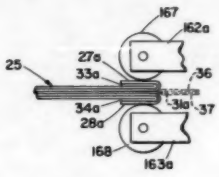
## METHODS AND APPARATUS FOR PREPARING THE TERMINATED END OF FLAT CABLE FOR CONNECTORIZATION

**Richard A. Greene, Pickerington, and Robert P. Kennedy, Columbus, both of Ohio, assignors to Western Electric Company, Inc., New York, N.Y.**

**Filed Jan. 4, 1982, Ser. No. 336,981**

**Int. Cl.³ H05K *3/00*; B23P *23/00***

**U.S. Cl. 29—829** **26 Claims**




1. A method of forming the terminated end of a flat cable of indefinite length with fold-back portions so as to facilitate the subsequent connectorization thereof, wherein the cable is of the type having two overlying/underlying arrays of laterally disposed conductors separated by a resilient insulative center film, with each array being secured directly to only the respectively adjacent one of two mutually disposed outer insulative films, and wherein the cable, as fabricated, further includes an aligned pair of insulative isolating members respectively positioned on opposite sides of, and extending transversely across, the center film at each predetermined terminated end of the cable, said isolating members being of a material that will not adhere to the associated array of conductors and outer film, said method including the steps of:

confining at least an end region of the flat cable such that only an end portion thereof of predetermined length is exposed,

applying a first force against the major surface of one outer film end section, in a first direction, to effect a sharp, retainable bend, at a predetermined angle, in both the other outer film end section, and the coextensive array of conductor end portions secured thereto;

releasing the first force from the one outer film end section so as to allow the center film end portion and the opposite side isolating members positioned thereon, to snap back to at least approximately their original positions as a result of the selective inherent resiliency thereof, thereby, also forcing the one outer film end section, and the coextensive array of conductor end portions secured thereto, back to at least approximately their original positions;

applying a second force against the major surface of the then one exposed isolating member previously positioned adjacent the other then bent-out outer film end section, in a second direction, to effect a sharp, retainable bond, at a predetermined angle, in both the one outer film end section, and the array of conductor end portions secured thereto;

releasing the second force from the one exposed isolating member so as to allow the center film end portion and the one and other side isolating members positioned thereon, to snap back to at least approximately their original positions as a result of the selective inherent resiliency thereof, and

applying a force against each of said bent-out outer film end sections, on the conductor-secured side thereof, and in a direction to effect the sharp fold-back thereof against the adjacent portion of the associated outer film that remains a part of the fabricated cable and, thereby, position the associated array of conductor end portions in the plane of the cable to facilitate the subsequent connectorization thereof.

15. An apparatus for forming the terminated end of a flat cable of indefinite length with fold-back portions so as to facilitate the subsequent connectorization thereof, wherein the cable is of the type having two overlying/underlying arrays of laterally disposed conductors separated by a resilient insulative center film, with each array being secured directly to only the respectively adjacent one of two mutually disposed outer insulative films, and wherein the cable, as fabricated, further includes an aligned pair of resilient insulative isolating members respectively positioned on opposite sides of, and extending transversely across, the center film at each predetermined terminated end of the cable, said isolating members being of a material that will not adhere to the associated array of conductors and outer film, said apparatus including:

positioning means including upper and lower channel-forming means for confining and controllably transporting a cable back and forth between first and second work stations, while an exposed end section of such a confined cable, of predetermined length, extends beyond two laterally disposed face portions of said upper and lower channel-forming means at the upstream end thereof;

flare-out die means including a reciprocally driven die member located at said second work station, said die member having a laterally disposed cable end-receiving notch formed therein and a specially contoured outer cable wiping surface profile, said die member, in response to being reciprocally displaced in a direction perpendicular to the initial plane of an exposed end of a channel-confined cable, while being brought into periodic wiping contact therewith, cooperating with the forward face portions of said upper and lower channel-forming means to sequentially effect the bending of the two exposed end sections of the outer films, together with the coextensive arrays of conductor end portions respectively secured thereto, at sharp predetermined angles, and in different directions, relative to the initially coextensive center film end portion, and associated isolating members, which are also momentarily sequentially bent, in said different directions, but each time allowed to snap back to at least their approximate original positions, one time because of the presence of said die member notch, and

reciprocally driven fold-back means located at said first work station for sharply folding back each previously outwardly bent outer film end section of a channel-confined cable, together with the array of exposed conductor end portions secured thereto, firmly against the adjacent portion of the outer film still remaining as part of the fabricated cable so as to facilitate the subsequent connectorization of the cable.

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**4,391,039**

## ELECTRIC WIRE TERMINAL CONNECTING METHOD

**Jonathan I. Kaplan, West Newton, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Division of Ser. No. 67,029, Aug. 16, 1979, Pat. No. 4,281,886. This application Jul. 22, 1981, Ser. No. 287,766**

**Int. Cl.³ H01R *43/00***

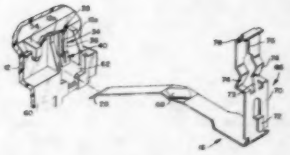
**U.S. Cl. 29—884** **1 Claim**

1. The method of assembling a photographic camera having an internal support member on which functioning electrical components are mounted to provide a functioning module for subsequent completion and assembly in an exterior housing, said method comprising the steps of:

assembling wire leads on said module for connection of components with a source of electrical energy;

fixing a conductive end portion of said wire leads to a non-conductive bracket formation;

pretesting said module by connecting a source of electrical test energy with said retained conductive end portions of said wire leads; and



assembling leaf-like battery contacts on said support member to be electrically joined with said wire lead conductive end portions after said pretesting step.

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**4,391,040**

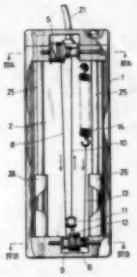
## HAIR CUTTING DEVICE

**Yukio Kanazawa, No. 880 Sekishi-cho, Hamamatsu-shi, Shizuoka-ken, Japan**

**Filed Oct. 8, 1981, Ser. No. 309,817**

**Int. Cl.³ B26B *19/20, 19/44***

**U.S. Cl. 30—201** **15 Claims**

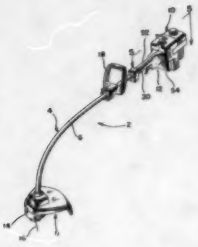


1. A hair cutting device comprising a unit consisting of a casing having an open end surface and an electrically operated clipper having fixed cutting blade end surface arranged adjacent the open end surface of the casing when in a home position so that both end surfaces may be in the same plane, guide means supporting the clipper for guided controlled movement in the casing, a first rotary drum mounted in the casing, a first thread mounted on the first drum and having one end connected to a connector fixable to a fixedly positioned external object, power transmitting means connecting the rotary drum with the clipper to operatively effect displacement of the clipper from the home position relative to the casing in response to rotation of the rotary drum so that rotation of the rotary drum causes the relative position of the clipper with respect to the casing to vary in response to the spacing of the unit from the fixedly positioned external object, and resilient means connecting the casing with the clipper for urging the clipper toward said home position.

## 4,391,041
## POWERED GROUND CARE IMPLEMENT

David E. Porter-Bennett, Willmar, Minn., assignor to The Toro Company, Minneapolis, Minn.

Filed Apr. 20, 1981, Ser. No. 255,571
Int. Cl.[3] A01D *50/00*
U.S. Cl. 30—296 R 14 Claims



1. A powered ground care implement, which comprises:
(a) active means for performing a grooming or working action on the ground or ground growing vegetation;
(b) an elongated upwardly extending handle assembly having a lower end on which the active means is carried, the handle assembly being sufficiently long so that a standing operator can hold the handle assembly while positioning the active means closely adjacent to or in contact with the ground;
(c) engine means for driving the active means, wherein the engine means has a crankshaft configured to cause engine vibration substantially more in a first direction than in other directions; and
(d) means for mounting the engine means on the handle assembly, wherein the mounting means includes means for vibrationally isolating the engine means from the handle assembly to help an operator hold the handle assembly when the engine means is operating, wherein the mounting means has means for damping out vibration primarily in the first direction, and wherein the mounting means comprises:
(i) a backing plate fixedly secured to the engine means;
(ii) an engine housing fixedly secured to the handle assembly for receiving the backing plate;
(iii) flexible means for mounting the backing plate in the engine housing so that vibration of the engine means is not transmitted to the housing.

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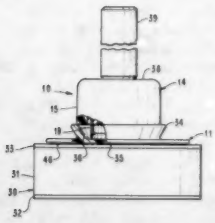
## 4,391,042
## CUTTING APPARATUS FOR CUTTING A NON-CIRCULAR OPENING

Ned E. Sunderland, 209 Melbourne Way, Lexington, Ky. 40503

Filed Jun. 18, 1981, Ser. No. 274,748
Int. Cl.[3] B26B *27/00*
U.S. Cl. 30—316 19 Claims



1. A cutting apparatus for cutting a non-circular opening in a face plate for a non-circular stoma in which the face plate has an annular flange to support a bag of an ostomy appliance including:
a body having a single recess in one surface thereof, said recess having a single continuous peripheral wall;
a non-circular cutting element disposed within said recess and extending a selected distance beyond said one surface of said body;
said body having a circular periphery to center said body relative to an annular flange of a face plate in which a non-circular opening is to be cut by said non-circular cutting element;
said recess in said body having a non-circular shape suostantially the same shape as said non-circular cutting element;
said non-circular cutting element having a selected non-circular shape in accordance with the shape of the non-circular stoma with which the face plate is to be used;
said non-circular cutting element having its outer surface straight and its inner surface beveled at its outer end to form the cutting surface of said non-circular cutting element;
and retaining means to permanently retain said non-circular cutting element in its desired position within said recess.

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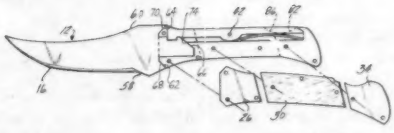
## 4,391,043
## KNIFE WITH REMOVABLE BLADES

Howard Sizemore, 26384 Couzens Rd., Madison Heights, Mich. 48071, and Robert Bruner, 1730 Peavey Rd., Howell, Mich. 48843

Filed Oct. 26, 1981, Ser. No. 314,589
Int. Cl.[3] B26B *1/00*
U.S. Cl. 30—330 9 Claims



1. A knife comprising:
an elongated blade comprising a cutting end having a sharpened edge extending along at least one side and a tang formed with sides extending generally away from said cutting end, and also having a recess extending into one side thereof, said tang formed at the end thereof remote from said blade cutting end with an angled surface;
said blade including a pair of inwardly and forwardly angled shoulders on either side of said tang;
a handle including grip portions and a socket at a forward end adapted to slidably receive said tang, said socket including a fixed angled surface aligned with said tang and adapted to mate with said tang angled surface upon full insertion of said tang in said handle socket;
and also including a pair of angled shoulders on said forward end of said handle adjacent said socket, and configured to be brought into mating engagement with said angled shoulders on said blade with said tang fully inserted in said socket;
an elongated locking plate and a pivotal mount pivotally mounting said locking plate to said handle at a point intermediate the length of the locking plate to allow limited pivoting motion between locking and releasing positions; said locking plate including a forward locking end and a rear-end, said locking end on a side adjacent to said socket, and formed with a locking tab configured to be moved downward into mating relationship with said recess in said tang, with said tang fully inserted in said socket;
spring bias means urging said locking plate to said locked position;

whereby said blade may be released by pivoting said locking plate rear-end to release position against the resistance of said spring bias means.

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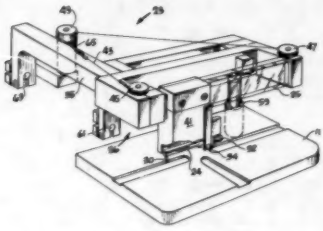
**4,391,044**

## METROLOGY INSTRUMENT FOR MEASURING VERTICAL PROFILES OF INTEGRATED CIRCUITS AND THE LIKE

**William R. Wheeler, Saratoga, Calif., assignor to Tencor Instruments, Mountain View, Calif.**

**Filed Sep. 28, 1981, Ser. No. 305,986**
**Int. Cl.³ G01B 7/28**
**U.S. Cl. 33—174 P** **7 Claims**



2. A tilt compensated stylus scanner comprising,
an elongated beam suspended in a frame, the beam supporting a housing movable along the beam,
a stylus mounted on a lower portion of said housing for contact with a generally flat article to be scanned linearly in the direction of said beam,
a transducer connected to said stylus for generating an electrical signal representing a step height profile of said generally flat article,
a bracket having spaced apart extensions with aligned pivots defining an axis for tilt compensation of the beam to be scanned relative to the article to be scanned, the tilt axis being perpendicular to said elongated beam, said bracket supported from a base at said pivots and having said frame mounted thereto,
force means communicating with said bracket for compensating undesired tilt of the beam, and
drive motor means for moving said movable housing on the beam.

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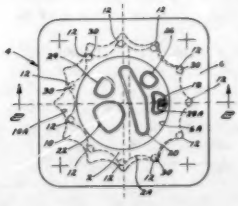
**4,391,045**

## DRAWING INSTRUMENT OR APPARATUS

**Denys Fisher, Kirkconnel Lea, Glencaple, Dumfries DG1 4RG, Scotland**

**Filed Mar. 16, 1981, Ser. No. 244,506**
**Claims priority, application United Kingdom, Mar. 18, 1980, 8009084; Sep. 19, 1980, 8029079**
**Int. Cl.³ B43L 11/00**
**U.S. Cl. 33—27 L** **11 Claims**



1. A self-indexing design drawing apparatus comprising a first member having a first substantially circular multi-lobed cam-shaped surface formed with a first number of identical angularly spaced outwardly projecting lobes, a second member having a second substantially circular multi-lobed cam-shaped surface formed with a second number of identical angularly spaced inwardly projecting lobes having notches therebetween, said first number being one less than said second number and the size and shape of said first lobes being correlated with the size and shape of said notches so that said first lobes engage and interfit in said notches between said second lobes, means for joining said first and second members together so that contact can be produced between successive portions of said cam-shaped surfaces, said first and second members being movable relative to each other, the size of said surfaces with respect to each other being such that when one of said lobes on said first member is fully received or engaged in one notch between two adjacent lobes on said second member there is a slight clearance between the lobe on said first member located substantially opposite said one lobe, said slight clearance being less than the distance said first lobes project from said first member and only sufficient to permit angular movement of said opposite lobe relative to the nearest lobe on said second member while said one lobe is fully received or engaged in said one notch between said two adjacent lobes on said second member, said first member having at least one shaped opening therein, whereby a design can be formed on a surface by tracing the opening shape in said first member with a writing instrument by engaging the edge of said opening and moving said instrument within said opening in one direction while engaging said edge, said first member having indexed one part of one revolution in an opposite direction with respect to said second member each time that the opening in the first member is traced.

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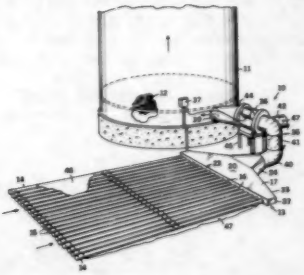
**4,391,046**

## SOLAR HEATED GRAIN DRYING SYSTEM

**Roy Pietraschke, Rte. #1, Box 194, Cuba, Mo. 65453**

**Continuation of Ser. No. 40,942, May 21, 1979, abandoned. This application Jun. 25, 1981, Ser. No. 277,228**
**Int. Cl.³ F26B 3/06, 3/28**
**U.S. Cl. 34—93** **4 Claims**



1. A method of utilizing straight cylindrical irrigation line pipes for a solar collector system for drying grain, comprising the steps of:
(a) dismantling the irrigation pipe line after the irrigation season to provide a plurality of pipe lengths,
(b) arranging the pipe lengths separately in side-by-side relation to receive solar heat,
(c) removably connecting one end of the pipe lengths to a manifold leaving the other end open,
(d) drawing air through the pipes and the manifold,
(e) directing warmed air from the manifold into a grain storage bin, and
(f) dismantling the solar collector system to utilize the pipes for irrigation during the irrigation season.

4,391,047

## HAND-HELD HAIR DRYER

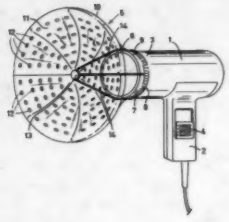
Wilhelmus G. E. Janssens, Drachten, Netherlands, and Heinz Merges, Cologne, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 17, 1980, Ser. No. 130,945

Claims priority, application Netherlands, Mar. 20, 1979, 7902158

Int. Cl.[3] F26B *19/00*

U.S. Cl. 34—97 5 Claims



1. An attachment formed of a substantially flexible material for use with a hair dryer having an air discharge nozzle, said attachment being expandable in use from a collapsed position to an expanded shape, which comprises an imperforate funnel-shaped wall portion open at both ends; means to connect the small end of said funnel-shaped wall portion to the air discharge nozzle; an outer end wall extending across the larger end of said funnel-shaped wall portion and being connected thereto, said outer end wall being provided with a plurality of outlet openings; and a plurality of flexible strips situated within the funnel-shaped wall portion and connecting the central portion of the outer end wall to the small end of the funnel-shaped wall portion, said flexible strips serving to maintain the outer end wall in its expanded shape during use.

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4,391,048

## ELASTIC SOLE FOR A SHOE INCORPORATING A SPRING MEMBER

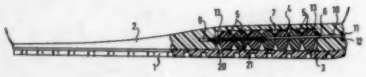
Dieter Lutz, Schweinfurt, Fed. Rep. of Germany, assignor to Sachs- Systemtechnik GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Dec. 16, 1980, Ser. No. 217,037

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1979, 2951572

Int. Cl.[3] A43B *13/18, 21/26*

U.S. Cl. 36—28 30 Claims



1. A shoe, particularly for use as a sport shoe, comprising an elastic sole, at least one chamber located in said sole, and a spring member formed of an elastomer material located within said chamber, wherein the improvement comprises at least one elongated tension rod located in and extending through said chamber and disposed generally parallel to said sole, at least two abutments spaced apart in the elongated direction of said tension rod, said spring member is located between said abutments, said spring members slidably displaceable within said chamber, and an adjusting device positioned on said tension rod and operable from the exterior of said sole for varying the distance between said abutments in the elongated direction of said tension rod for adjusting said spring member.

4,391,049

## COVERING ELEMENT OR TONGUE FOR ROCK-CLIMBING AND SIMILAR SPORT BOOTS

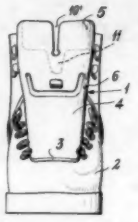
Francesco Parisotto, Asolo, Italy, assignor to CALZATURIFICIO S.C.A.R.P.A. S.n.c. di Parisotto Francesco & C., Italy

Filed Jan. 30, 1981, Ser. No. 229,949

Claims priority, application Italy, Feb. 12, 1980, 20768/80[U]

Int. Cl.[3] A43B *5/04, 23/26*

U.S. Cl. 36—114 5 Claims



1. A covering element or tongue for rock-climbing and similar sport boots, comprising:

a single, shaped laminar element divided into first and second parts, one end of one part being connected to an opposite end of the other part by hinge means formed by a partly notched intermediate zone of the covering element, and wherein one end region of one part overlies and is superimposed over an end region of the other part so that said one end of one part is relatively slidable or longitudinally moveable with respect to said opposite end of the other part, whereby an improved flexibility is imparted to the covering element.

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4,391,050

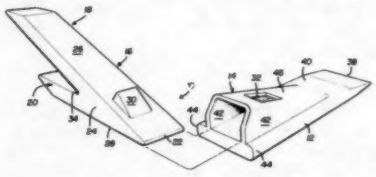
## TOOTH ASSEMBLY

Wayne G. Smith, and Herman J. Maurer, both of Burlington, Iowa, assignors to J. I. Case Company, Racine, Wis.

Filed May 1, 1981, Ser. No. 259,347

Int. Cl.[3] E02F *9/28*

U.S. Cl. 37—142 A 1 Claim



1. A digging tooth assembly comprising:

an elongated generally rectangular digging tooth of hard wear-resisting material having substantially parallel top and bottom surfaces and opposed side surfaces, said digging tooth being substantially rectangular in transverse cross-section and tapered to a horizontal cutting edge at one end;

a generally V-shaped support shank including top and bottom spaced apart portions which converge at one end to form a tip portion for the shank, said shank including flat top and bottom surfaces which converge to said tip portion, said top and bottom portions of said shank forming an undercut adaptable for mounting said shank on the cutting edge of an excavating machine;

a resilient housing mounted to the top surface of said digging tooth, said housing having an open end and including opposed side walls which intersect the top surface of said digging tooth inwardly of the opposed side surfaces of

said digging tooth, and said housing being mounted over the tip portion of said shank, said housing being substantially U-shaped in transverse cross-section having a top wall extending between and connecting said side walls, said side walls being flat and substantially parallel to lie closely against the tip portion of said shank and said side walls being substantially triangular in side elevation and including upper edges sloping downwardly and forwardly to engage against said tip portion of said shank;

retaining means for releasably securing said digging tooth to said shank, said retaining means including a wedge-shaped projection mounted on the top surface of said shank, said projection being inclined relative to said shank top surface, said projection being received for locking engagement within an opening formed through the top wall of said housing for mounting said digging tooth to said shank, and said digging tooth being held on said shank tip portion by the locking coaction between said projection and said opening and the resiliency of said housing; and

said top surface of said digging tooth abutting only against the flat bottom surface of said shank and said bottom surface of said digging tooth being spaced downwardly from the bottom surface of said shank with the top and bottom surfaces of said digging tooth being generally parallel to the bottom surface of said shank such that the impact force against said tooth is transmitted through said resilient housing to said support shank, and wherein the longitudinal axis of said support shank being on a vertical plane that is perpendicular to the horizontal digging tooth cutting edge, and the digging tooth cutting edge providing a horizontal cutting action during excavation whereas said supporting shank providing a subsequent vertical cutting action.

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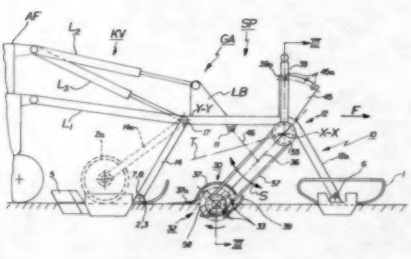
**4,391,051**

## MACHINE ARRANGEMENT FOR FORMING TRACKS AND/OR LEVELLING SURFACES RELATED TO CROSS-COUNTRY SKI TRAILS OR DOWNHILL SKI SLOPES

**Anton R. Bächler, Seeburgstrasse 10, 6006 Luzern, Switzerland**

**Filed Jun. 29, 1981, Ser. No. 278,695**
**Claims priority, application Switzerland, Jul. 4, 1980, 5149/80**
**Int. Cl.³ E01H *4/00*; E01C *19/41***
**U.S. Cl. 37—223** **17 Claims**




1. Apparatus for treating a snow cover of varying height to make tracks for ski trails and/or to level surfaces for ski slopes and adapted to be attached to and positioned in front of a driving vehicle, comprising a frame, at least one front support, at least one rear support, said front and rear supports being adapted to contact the snow cover and support the apparatus thereon, pivot means for connecting said front and rear supports to said frame, cutting means connected to said frame between said front and rear supports for treating the snow cover, and coupling means for attaching said frame to the driving vehicle, said coupling means being responsive to the height of the snow cover relative to the driving vehicle whereby said frame and thereby said cutting means may move vertically relative to the driving vehicle to adjust their vertical position to the height of the snow cover.

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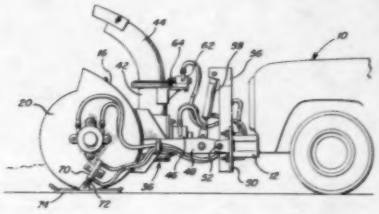
**4,391,052**

## SNOW BLOWER

**Burlin A. Guy, Jr., P.O. Box 83, Caroga Lake, N.Y. 12032**

**Filed Dec. 23, 1981, Ser. No. 333,727**
**Int. Cl.³ E01H *5/04, 5/09***
**U.S. Cl. 37—236** **7 Claims**



1. A snow blower assembly including a horizontally elongated and laterally opening shroud having one open longitudinal front side and one closed longitudinal rear side as well as opposite end mounting structures at least substantially closing the opposite ends of said shroud, a pair of spiral bladed rotary conveyor members journalled in the opposite end portions of said shroud for simultaneous rotation about an axis extending longitudinally of said shroud, said closed side including a lateral outlet formed therein centrally intermediate said mounting structures and opening rearwardly outwardly of said shroud, a horizontal axial inlet and upwardly opening tangential outlet blower assembly supported relative to said closed side of said shroud and including a rotary impeller registered with said lateral outlet, first and second fluid motors drivingly coupled to said rotary conveyor members and said rotary impeller, each of said first and second fluid motors being of the variable speed type, a pair of opposite end laterally extending horizontal skids carried by opposite ends of said shroud and projecting slightly below the lower periphery of said shroud, rearwardly projecting arm means carried by said shroud, a prime mover including front and rear ends, means pivotally supporting the rear ends of said arm means from said prime mover for angular displacement about a horizontal axis generally paralleling the first mentioned axis, first motor means operatively connected between said arm means and said prime mover for adjustably angularly displacing said arm means relative to said prime mover, said tangential outlet including a horizontally curving outlet head rotatably supported therefrom for rotation about an upstanding axis concentric with said tangential outlet, and second motor means operatively connected between said outlet head and said tangential outlet for adjustably angularly displacing said head relative to said tangential outlet, support means supporting said skids from said shroud for vertical adjustment relative thereto, said support means including fluid motor means for adjustably shifting said skids relative to said shroud.

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**4,391,053**

## VISOR PICTURE FRAME

**Alfred Anthony, Westport, Conn., assignor to Yankee Metal Products, Inc., Norwalk, Conn.**

**Filed Jun. 1, 1981, Ser. No. 268,773**
**Int. Cl.³ A47G *1/06*; G09F *1/12*; B60J *3/00***
**U.S. Cl. 40—152** **13 Claims**

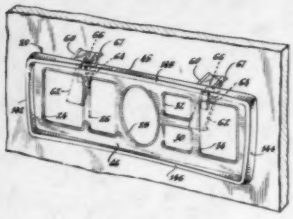
1. For displaying a plurality of pictures, a frame assembly adapted to be detachably secured to the sun visor of an automotive vehicle or the like comprising:

a rigid frame member including a top, a bottom and a pair of side edges joining said top and bottom edges;

a front panel affixed to said frame member, said panel having a plurality of viewing openings therein;

a backing plate removably mounted within said frame member behind said front panel adapted to removably receive a plurality of pictures thereon behind said viewing openings in said front panel; and

at least one resilient clip integrally attached to said frame



member and overlying the rear surface of said backing plate for mounting said assembly to another supporting surface, said clip including a substantially planar top portion extending rearwardly from and coplanar to the top edge of said frame member and a bottom portion extending downwardly from said top portion having a pair of generally parallel spaced edges for contacting said supporting surface in gripping relation thereto.

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**4,391,054**

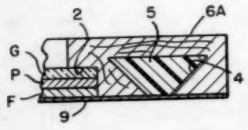
**METHOD, APPARATUS AND ARTICLE FOR FORMING A PICTURE FRAME**

**John R. Schovee, 10 Burr Oak Dr., Pittsford, N.Y. 14534**

**Filed Oct. 3, 1980, Ser. No. 193,809**

**Int. Cl.³ A47G *1/06*; B32B *31/18***

**U.S. Cl. 40—154** **31 Claims**




1. In a method of making frames from a plurality of frame sections comprising:

(a) providing a length of frame section;

(b) forming a groove in a surface of said length of frame section and inserting a fusible strip into said groove;

(c) cutting said molding across said fusible strip into a plurality of sections that mate together at corners to form a frame;

(d) abutting said sections at said corners of the frame; and

(e) fusing the abutting ends of said fusible strip together at said corners, whereby said sections of molding are held together to form a frame.

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**4,391,055**

**AMMUNITION MAGAZINE**

**Azriel Kadim, Tel Aviv, Israel, assignor to Orlite Engineering Ltd., Nes Ziona, Israel**

**Filed Jul. 18, 1980, Ser. No. 170,087**

**Int. Cl.³ F41C *25/02***

**U.S. Cl. 42—50** **5 Claims**

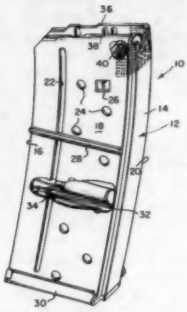
1. An ammunition magazine formed of plastic and comprising:

a housing defining a pair of side walls and front and rear edge walls joining said pair of side walls, said housing defining an opening;

a bullet support plate located in said housing;

a spring disposed in said housing and underneath said support plate for urging bullets towards said opening,

said opening being configured to provide means for retention of bullets located in said housing; and




reinforcing means in the form of a reinforcing web moulded into said housing and spanning said rear edge wall and parts of said pair of side walls adjacent thereto in a region adjacent said opening for preventing fracture of said housing upon impact.

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**4,391,056**

**RETAINING MEANS FOR REVOLVER CYLINDERS**

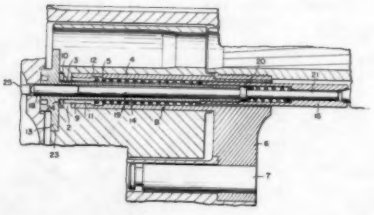
**Jose C. M. Bornancini, Porto Alegre, Brazil, assignor to Forjas Taurus S/A, Porto Alegre, Brazil**

**Filed Dec. 23, 1980, Ser. No. 219,433**

**Claims priority, application Brazil, Dec. 27, 1979, 7908530**

**Int. Cl.³ F41C *1/00***

**U.S. Cl. 42—62** **5 Claims**



1. In a firearm including a frame, a hammer mounted in the frame, a barrel, a cylinder opening between said hammer and said barrel, a bore in the wall of the cylinder opening beneath said hammer, a cylinder rotatably mounted in said opening and tiltably movable out of said opening for the loading and extraction of cartridges therefrom, said cylinder having a centrally disposed bore, a hollow cylinder axle telescopically fitted within said cylinder bore, a cartridge extraction mechanism, said mechanism including an extractor rod having an inner end and an outer end, a star shaped member at the outer end of said rod, the improvement comprising a resilient bushing fitted in that end of the cylinder bore adjacent said hammer, said end of the cylinder bore having a recess therein, said recess being of lesser diameter than the diameter of the remainder of the bore, a projection extending into said recess, means on said bushing cooperating with said projection to fix said bushing against rotation, retaining means on the inner wall of said cylinder axle, retaining means on the outer wall of said bushing, whereby when said cylinder axle is moved axially in said cylin-

der bore from the barrel end of said frame toward said hammer, said cylinder axle retaining means and said bushing retaining means engage with each other and connect the bushing to said cylinder axle.

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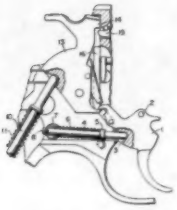
**4,391,057**

**ACTUATOR SYSTEM FOR THE RETURN OF THE TRIGGER IN DOUBLE-ACTION REVOLVERS**

**Jose C. M. Bornancini, Porto Alegre, Brazil, assignor to Forjas Taurus S/A, Porto Alegre, Brazil**

**Filed Dec. 23, 1980, Ser. No. 219,432**
**Claims priority, application Brazil, Dec. 27, 1979, 7908531[U]**
**Int. Cl.³ F41C *1/00, 19/00***
**U.S. Cl. 42—65** **15 Claims**



1. A trigger return actuator mechanism for a double-action revolver having a hammer and trigger pivotally supported within a frame, a hammer rod provided with a mainspring and engaging said hammer, said mechanism including an actuating rod provided with a forward end bearing against said trigger, an abutment member within said frame having a bore therethrough, said actuating rod having a rear end slidably disposed through said bore, said abutment member mounted within said frame for rotary displacement about a fixed transverse axis, and spring means biasing said actuating rod forward end away from said abutment member and toward said trigger.

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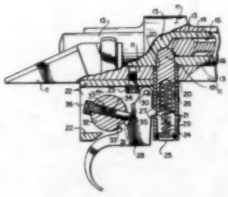
**4,391,058**

**TRIGGER AND FIRING MECHANISM FOR BOLT ACTION RIFLE**

**Richard J. Casull, P. O. Box 276, Freedom, Wyo. 83120**

**Filed Jan. 12, 1981, Ser. No. 224,183**
**Int. Cl.³ F41C *19/00, 17/02***
**U.S. Cl. 42—69 A** **5 Claims**



1. In a bolt action type firearm, in which the barrel of the firearm is attached to a receiver and a bolt is received in a bore in the receiver, an improved firing mechanism comprising

a longitudinal bore within the bolt extending from the head end of the bolt;

an elongate firing pin positioned in said longitudinal bore, with the forward end of the pin adapated to project from the forward end of the bolt to strike the end of a cartridge in the firing chamber of the firearm when the bolt is in its closed position, and with the rear end of the firing pin positioned near the innermost end of the longitudinal bore in said bolt;

a cammed notch in the bolt extending inwardly from a longitudinal side of the bolt and intersecting the innermost end of the longitudinal bore in said bolt;

an opening in the receiver adapted to be in alignment with the cammed notch in the bolt when the bolt is in its closed position;

an elongate spring-biased puncher having a recess in its side surface, said puncher being adapted to move lengthwise within the opening from a cocked position in which the lead end of the puncher is substantially withdrawn from the cammed notch to a fired position in which the lead end of the puncher enters into the cammed notch in the bolt so as to strike the rear end of the firing pin, with said cammed surface on the cammed notch being adapted to push the puncher from the cammed notch in the bolt to the puncher's cocked position during movement of the bolt to extract a spent shell casing from the firearm;

trigger means having a sear pin thereon adapted to engage the recess in the spring-loaded puncher when the puncher is moved into its cocked position, whereby the puncher is retained in its cocked position until the trigger is pulled so as to move the sear pin from the recess in said puncher, whereupon the puncher moves into the cammed notch in the bolt and strikes the firing pin and the firing pin is, in turn, forced forward so as to strike the end of the cartridge in the firing chamber of the firearm.

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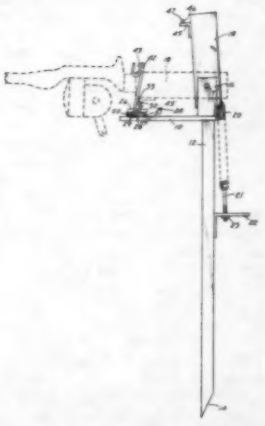
**4,391,059**

**AUTOMATIC FISH HOOK SETTER**

**Samuel Cordova, Denver, Colo., and Robert J. Spitz, 1548 S. Gray, Lakewood, Colo. 80226, assignors to Robert J. Spitz, Lakewood, Colo.**

**Filed Apr. 10, 1981, Ser. No. 253,065**
**Int. Cl.³ A01K *97/00***
**U.S. Cl. 43—15** **4 Claims**



1. In an automatic fishing device having a base for securing to a rigid structure, and a pivoted pole holding tube spring biased to an upright position, the improvement of:

(a) latch/release means arranged to temporarily hold the pole holding tube in downwardly pivoted position,

(b) said latch/release means including:

(1) a plate generally centrally mounted for limited pivotal movement on the base and an upright latch plate mounted on said plate and having an aperture therein,

(2) spring means biasing said plate toward a latching direction,

(3) stop means limiting the biased pivotal movement of said plate in said latching direction,

(4) a pin mounted on the pole holding tube positioned to mate with and be held in said aperture in said latch plate,

(5) the top edge of said latch plate being beveled toward said pin so as to aid the latching of the pole holding tube, and

(6) trigger means rigidly secured to said latch/release means and having a portion extending beyond said latch plate and generally aligned therewith, said portion extending beyond said latch plate including fish line holding means, whereby said latch/release means permits easy one hand latching of said pole holding tube in a down position under spring bias.

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**4,391,060**

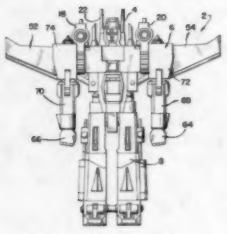
**TOY ROBOT VEHICLE ASSEMBLY**

**Shigeru Nakane, Yachiyo, Japan, assignor to Takara Co., Ltd., Osaka, Japan**

**Filed Aug. 21, 1981, Ser. No. 294,894**

**Int. Cl.³ A63H *33/00***

**U.S. Cl. 46—22** **11 Claims**



1. A toy assembly simulating a robot of humanoid form with removable members reconfigurable into separate toy vehicles comprising:

a first member configured to simulate a robotic humanoid head and trunk;

a second member removably attached to the first member and configured to simulate a pair of robotic humanoid arm appendages;

a third member removably attached to the first member and configured to simulate a pair of robotic humanoid leg appendages;

means on the first member for removable connection to the second and third members, and

means for providing locomotion on each of the first, second and third members to permit each member to operate independently as separate vehicles.

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**4,391,061**

**MUSICAL TOY**

**A. Edward Fogarty, and Bonnie R. Fogarty, both of 3513 School Ave., Sarasota, Fla. 33579**

**Filed Dec. 22, 1981, Ser. No. 333,580**

**Int. Cl.³ A63H *29/16***

**U.S. Cl. 46—44** **3 Claims**

1. A musical toy, comprising:

(a) a housing;

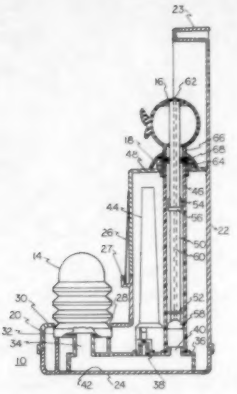
(b) a plurality of air manifolds positioned in the interior of said housing, each of said air manifolds having an inlet port, a first outlet port and a second outlet port;

(c) a plurality of bellows operatively positioned in openings through said housing, each of said bellows having its open end in fluid communication with said inlet port of one of said air manifolds;

(d) a plurality of whistles positioned in the interior of said housing, each of said whistles having one of its ends in fluid communication with said first outlet port of one of said air manifolds;

(e) a plurality of tubes positioned essentially vertically in the interior of said housing, each of said tubes having its lower end in fluid communication with said second outlet port of one of said air manifolds and its upper end extending out of an opening through said housing;

(f) a plurality of pistons moveably positioned in said tubes,



each of said pistons having a flexible seal on its lower end, a lower flange, an upper flange, a centering ring resting on said upper flange and its upper end extending out of said upper end of one of said tubes;

(g) means for limiting the distance of travel of said pistons; and

(h) a plurality of moveable ornaments exterior to said housing, each of said moveable ornaments being connected to one of said pistons.

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**4,391,062**

**INFLATABLE ARTICLES**

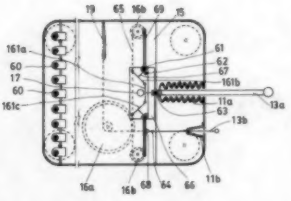
**Sidney H. Magid, 4th Fl., No. 10, Alley 5, La. 12, Section 4, Jen Ai Rd., Taipei, Taiwan**

**Filed Jun. 23, 1981, Ser. No. 276,513**

**Claims priority, application Taiwan, Jun. 1, 1981, 7011599**

**Int. Cl.³ A63H *3/06***

**U.S. Cl. 46—88** **13 Claims**



1. An inflatable article comprising:

an inflatable envelope made of a gas impervious material which is at least in part resilient and has at least one inflating valve provided thereon;

at least one flexible hollow protrusion attached to a wall of said envelope, said hollow protrusion having a closed end and an open end;

at least one external control element connected with the closed end of said hollow protrusion and extending out-

wardly from said hollow protrusion so that said protrusion can be flexed from a normally unflexed position by an external force, applied by a user, to activate said external control element;

an internal supporting element attached to the wall of said envelope;

an engaging member provided on said closed end of said hollow protrusion;

at least one movement imparting element capable of being selectively engaged and disengaged with the closed end of said hollow protrusion by means of said engaging member;

at least one internal movable object contained in said envelope, said movable object being movable by said movement imparting element;

one or more returning elements associated with said hollow protrusion for returning said hollow protrusion to its unflexed position after said external force is released.

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**4,391,063**

## BALLOON WITH SEALING DEVICE THEREFOR AND METHOD

**H. Ross Gill, III, Ashland, Ohio, assignor to The National Latex Products Co., Ashland, Ohio**

**Filed Jun. 22, 1981, Ser. No. 275,858**

**Int. Cl.**[3] **A63H** *3/06;* **B32B** *15/14, 15/20;* **B65D** *63/02*

**U.S. Cl. 46—90** **10 Claims**

**1.** A combined sealing device and flexible retainer line for a toy balloon, comprising a double wall thickness strip of deformable but self-sustaining foil with the retainer line being non-self-sustaining, as for example string, disposed intermediate the walls of said double wall thickness foil strip, and extending for substantially the full length of said strip as well as extending a predetermined amount of substantially greater length as compared to the length of said strip from an end of said strip, for providing for gripping of the line by the balloon user, said walls of said strip being secured to one another by an adhesive disposed between the same, said adhesive also securing said line to said strip walls intermediate thereof, the wall thickness of said foil being in the range of approximately 0.001 of an inch to 0.002 of an inch, said strip being readily wound or twisted about the neck of an inflated balloon by one's fingers and being self-sustaining in said wound or twisted condition for expeditiously sealing the balloon against the escape of pressure from within the balloon's interior while at the same time securely attaching the retainer line to the balloon, said combined sealing device and attached retainer line being readily removable from the balloon neck by unwinding or untwisting said strip.

**5.** In combination a toy balloon comprising an inflatable resilient body portion and a neck portion connected to said body portion, and a combined sealing device and flexible retainer line wound or twisted about the neck portion and carried thereby, said sealing device comprising a relatively thin deformable but self-sustaining strip of foil of double wall thickness with said flexible retainer line being non-self-sustaining, as for example string, attached to said strip intermediate the walls of said strip, said line extending for substantially the full length of said strip as well as extending a predetermined amount of substantially greater length as compared to the length of said strip from an end of said strip, for providing for gripping of the line by the balloon user, said walls of said strip being secured to one another by an adhesive disposed between the same, with said adhesive also securing said line to said strip walls intermediate thereof, the wall thickness of each of said strip walls being in the range of approximately 0.001 of an inch to 0.002 of an inch, said strip encircling the exterior of said neck portion and being readily wound or twisted about the neck portion of the inflated balloon by one's fingers, and being self-sustaining in said wound or twisted condition and preventing the escape of air through said neck portion, while securing said flexible retainer line to said balloon, said combined sealing device and retainer line being readily removable from said balloon by unwinding or untwisting said strip from about said neck.

**8.** A method of forming a combined sealing device and flexible retainer line for a toy balloon comprising, providing a relatively thin deformable but self-sustaining elongated section of foil having on one side thereof a coating of adhesive, the wall thickness of said foil being in the range of approximately 0.001 of an inch to 0.002 of an inch, laying a non-self-sustaining retainer line such as a string or the like longitudinally of said foil section for substantially the full length of said section with the line extending a predetermined amount of substantially greater length as compared to the length of said section from an end of said section, and then folding said foil section upon itself to form an elongated foil strip of double wall thickness which clasps said retainer line therein, with said adhesive securing the double wall thickness of the foil together and to the intermediate retainer line, said strip being self-sustaining but being readily wound or twisted about the neck of an inflated toy balloon for expeditiously sealing the latter against the escape of pressure from within the balloon and at the same time being operable to securely attach the retainer line to the balloon, with said combined sealing device and attached retainer line being readily removable from the balloon by unwinding or untwisting the strip from about the neck of the balloon.

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**4,391,064**

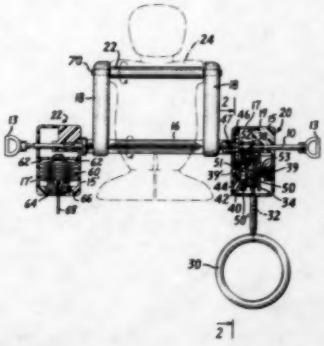
## ACROBATIC TOY

**Willis M. Lakin, 7879 Northway Dr., Hanover Park, Ill. 60103; Faith L. Goodman, North Bergen, N.J., and Diane L. Savoca, Howard Beach, N.Y., assignors to Willis Lakin, Hanover Park, Ill.**

**Filed Dec. 29, 1980, Ser. No. 220,463**

**Int. Cl.**[3] **A63H** *13/12*

**U.S. Cl. 46—130** **3 Claims**




**1.** A toy comprising:

(a) supporting means comprising a cross bar and a pair of eyelets on the respective ends of said cross bar wherein a

pair of spaced bearing sleeves is on and rotatable about said cross bar;

(b) a hollow main shaft, disposed around, rotatably supported by said supporting means at spaced locations along said main shaft;

(c) a figure suspended on said main shaft, wherein said figure comprises a body and a pair of arms, said pair of arms being fixedly attached at their respective one ends to said main shaft and pivotally mounted to said body at their respective other ends;

(d) driving means for rotating said main shaft about its axis, said means comprising a cord wound about a reel, a ratchet gear means arranged between said reel and said main shaft, wherein the gears of said ratchet gear means positively engage for driving said main shaft when said cord is pulled and thereby unwound from the reel, and wherein said gears slip as the cord is rewound onto the reel so as not to drive said main shaft;

(e) biasing means for rewinding the cord onto the reel;

(f) means for suspending said supporting means and hence the toy from a crib or the like for providing counterforce to pulling action on said cord;

(g) a first and second housing supported at spaced locations by said supporting means and means for attaching said housings to said cross bar, wherein said first housing comprises a gear housing for containing said driving means;

(h) a drive shaft mounted in said gear housing, wherein said driving means is contained on said drive shaft, wherein said reel is rotatably mounted on said drive shaft and axially displaceable along said drive shaft, and wherein said driving means comprises a first ratchet gear on said reel, a second ratchet gear fixed on said drive shaft for cooperating with said first ratchet gear, a spring fixed at one end on said gear housing and at the other end to said reel for urging said first ratchet gear into engagement with said second ratchet gear, and an output gear fixed on one of said drive shaft and said second ratchet gear for driving said main shaft when said cord is pulled and said ratchet gears are in positive engagement;

(i) a drive gear coupled with said main shaft for rotation therewith and engaging said output gear wherein one of said bearing sleeves forms a part of said driving gear; and

(j) a pivot shaft extending through aligned holes in said other ends of said arms and said body for rotatably mounting said body to said arms.

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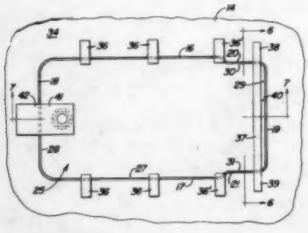
**4,391,065**

## COVER PLATE FOR ACCESS OPENING

**Dennis A. Rice, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.**

**Filed Jul. 27, 1981, Ser. No. 286,796**
**Int. Cl.³ E05C *21/02***
**U.S. Cl. 49—465** **8 Claims**



1. In combination, a plate structure forming part of a housing and having an access opening therein; a cover plate positioned in said opening having an enlarged portion closing the main part of the opening and a small portion contiguous with and extending from the enlarged portion closing a matching part of the opening, said plate structure and said cover plate having internal and external surfaces extending from the respective edges of the opening and plate; a series of rigid stop elements fixed to the internal surface of the plate structure adjacent the edges of the opening and extending beyond the edges into said opening and engaging the internal surface of the cover plate so as to limit movement of the cover to a position in which the internal and external surfaces of the plate structure and cover are co-extensive at their edges, and in which two of the elements are on opposite sides of the opening in the areas where the edges forming said main part of the opening join the edges forming the aforesaid matching part of the opening; a rod fixed to the internal surface of and extending across the small portion of the cover plate and having opposite end sections that extend beyond the opposite edges of the small portion and engage the internal surface of the plate structure, said end sections being inclined in a direction toward the external surface and when in a free state, extending to ends beyond the internal surface; and means spaced from said rod and extending between the plate structure and cover plate for drawing the cover plate against the stop elements to thereby distort said rod end sections.

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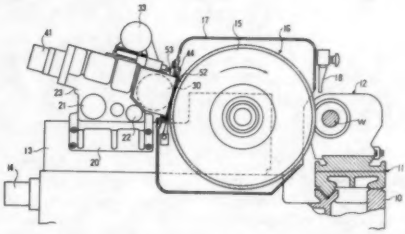
**4,391,066**

## GRINDING MACHINE WITH DETECTION DEVICE FOR USEABLE LIMIT OR GRINDING WHEEL

**Kenichi Munekata; Kunihiko Unno, both of Kariya, and Norihiko Shimizu, Nagoya, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan**

**Filed Jun. 15, 1981, Ser. No. 273,580**
**Claims priority, application Japan, Jun. 18, 1980, 55-82447**
**Int. Cl.³ B24B *49/18***
**U.S. Cl. 51—165.87** **13 Claims**



1. A grinding machine having a truing device of the type wherein a grinding wheel is trued by in-feeding a truing tool a predetermined truing in-feed amount against said grinding wheel at the time of each truing operation, comprising:

truing tool wear detection means for detecting a total wear amount $\Sigma\Delta r$ of said truing tool after each truing operation, and

arithmetic and judgement means coupled to said truing tool wear detection means for receiving said total wear amount $\Sigma\Delta r$ and for judging whether or not said grinding wheel has been worn down to a predetermined size limit Rmin based upon at least said total wear amount $\Sigma\Delta r$.

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**4,391,067**

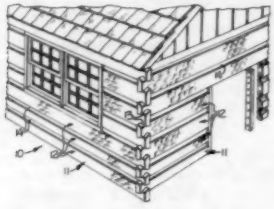
## LOG WALL CONSTRUCTION FOR LOG HOME

**Dale A. Frady, and David C. Frady, both of Waynesville, N.C., assignors to Frontier Homes, Inc., Waynesville, N.C.**

**Filed Apr. 14, 1980, Ser. No. 140,240**
**Int. Cl.³ E04B *1/10, 1/78***
**U.S. Cl. 52—97** **24 Claims**

1. A building wall comprising a plurality of logs arranged generally parallel, one above another, said logs having respective inner and outer sides and respective upper and lower sides positioned in opposing relation to the adjacent upper and

lower sides of other logs, the upper side of each of said logs including a longitudinally extending generally vertical abutment surface located between the inner and outer sides of the log and a longitudinally extending inclined surface portion adjoining said abutment surface and sloping continuously downwardly therefrom toward and adjoining the outer side of said log, respective longitudinally extending filler panels located between the upper side of each log and the lower side of



the next higher log and positioned against said vertically extending abutment surface on the upper side of the log for substantially filling any longitudinal spaces between adjacent logs, and a hardenable filler material located between the upper side of each log and the lower side of the next higher log and covering the outer side of said filler panel located therebetween to provide a seal between adjacent logs to prevent the passage of water and air through said wall.

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**4,391,068**

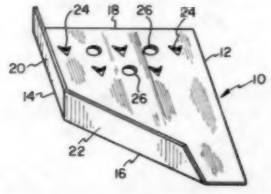
## WATER DEFLECTOR

**Walter F. Kosar, 103 Elmore Rd., Pittsburgh, Pa. 15221**

**Filed Apr. 24, 1981, Ser. No. 257,394**

**Int. Cl.³ E04D** *13/00*

**U.S. Cl. 52—97** **7 Claims**




5. A deflector adapted to be mounted between overlapping shingles along the edge of a roof, said deflector comprising:

(a) a substantially flat base with a side edge and a front edge extending at an angle from said side edge, said base including at least one tab adapted to engage the lower surface of a shingle placed on top of said base and secure said base thereto,

(b) a first upstanding lip integral with said base along said side edge and substantially perpendicular to said base, and

(c) a second upstanding lip integral with said base along said front edge and integral with said first lip and substantially perpendicular to said base, said upstanding lips forming a continuous deflector lip adapted to deflect liquid.

**4,391,069**

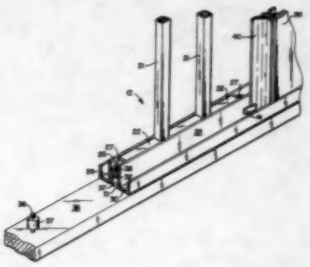
## FREE STANDING WALL

**Eugene F. Vermillion, Columbus, Ohio, assignor to The Columbus Show Case Company, Columbus, Ohio**

**Filed Oct. 23, 1980, Ser. No. 200,026**

**Int. Cl.³ E04D** *15/00*

**U.S. Cl. 52—126.4** **4 Claims**



1. A prefabricated, free standing wall comprising:

(a) an elongated floor-mounted, substantially horizontally disposed sill member formed with upwardly opening, longitudinally coextensive, transversely spaced apart, medial and first and second lateral channels;

(b) an elongated substantially horizontally disposed cap member formed with downwardly opening, longitudinally coextensive transversely spaced apart, medial and first and second lateral channels;

(c) a plurality of substantially vertically disposed frame members extending between and connecting said sill and cap members in relatively spaced apart, coplanar relation, each of said frame members having laterally outwardly projecting, horizontally extended foot and head sections secured in the medial channels of said sill and cap members, respectively;

(d) a plurality of substantially vertically disposed, horizontally spaced apart panel-positioning studs having opposite end portions positioned in each of the first and second lateral channels of said sill and cap members; and

(e) at least two, coplanar wall panels removably carried in each of the first and second lateral channels of said sill and cap members and having adjacent edges thereof disposed in abutment with and separated by one of said studs.

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**4,391,070**

## CHIMNEY

**Manfred Bönighausen, Bochum, Fed. Rep. of Germany, assignor to Babcock-Bau GmbH, Oberhausen, Fed. Rep. of Germany**

**Filed Feb. 27, 1981, Ser. No. 239,116**

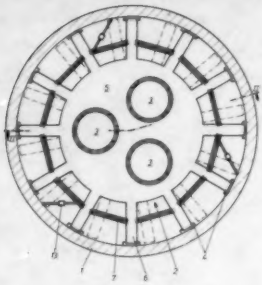
**Claims priority, application Fed. Rep. of Germany, Feb. 29, 1980, 3007719**

**Int. Cl.³ E04H** *12/28;* **F23J** *13/02;* **E04B** *1/35*

**U.S. Cl. 52—127.2** **5 Claims**

1. Method for constructing a chimney having a loadbearing external trunk which is built in sliding or climbing shuttering and supports platforms for accommodating flue gas pipe or flue gas pipes, comprising the steps: forming support elements on the inner wall of the external trunk at planned levels of the platforms; constructing said support elements as individual brackets; providing the platforms with support arms; building the platforms with support arms completely within the external trunk at ground level; raising the platforms to respective levels with lifting equipment; passing each platform by the brackets when being raised to a respective level; turning the

hanging platform by an amount so as to locate its support arms above the brackets; and then lowering the platform with sup-



porting arms onto the brackets, said platforms and support elements being prefabricated.

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**4,391,071**

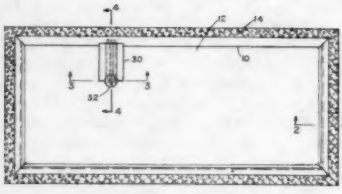
**BASEMENT WATER DRAIN COVE**

**Socrates J. Schantz, Marine, Ill., assignor to Schantz & Sons, Inc., Marine, Ill.**

**Filed Aug. 28, 1980, Ser. No. 181,986**

**Int. Cl.³ E04B** *1/70;* **E04F** *17/00;* **E02D** *31/02*

**U.S. Cl. 52—169.5** **3 Claims**



1. A unitary integral plastic or rubber-like drain cove of uniform composition for draining water from a basement wall along a junction of the wall and floor which comprises a base member secured in sealed relation on the floor adjacent to and spaced from said wall to define a drain channel bounded by the wall, the floor and said base member and a water directing cove member integrally connected to said base member extending upwardly from and inwardly of said base and having a water directing portion at a top part of the cove member extending downwardly toward and bearing lightly against the wall and being free of any connection thereto to provide water drain means for moisture on said wall surfaces to said drain channel, said base member extending outwardly along the floor from a bottom portion of the cove member, said water directing portion being constructed of a plastic or rubber-like material having the capacity to conform to irregularities in the wall surface against which it bears and extending from a point above and inwardly from said base member and spaced from said wall downwardly toward and against said wall to provide a gutter defining said water drain means and said base member being spaced from said wall and secured to the floor outwardly of said water directing portion.

**4,391,072**

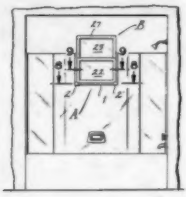
**WINDOW TRIM**

**John W. Moore, Creve Coeur, Mo., assignor to The Swan Corporation, St. Louis, Mo.**

**Filed Dec. 29, 1980, Ser. No. 220,807**

**Int. Cl.³ E06B** *1/04*

**U.S. Cl. 52—211** **10 Claims**



1. A window trim assembly for use with a building window having a sill and jambs at opposite sides of said window, for the purpose of modifying the appearance of said window, said assembly comprising a sill trim component for covering disposition of said sill including a main or body section of planar configuration and an apron depending from a horizontal edge of said main body portion for obscuring the adjacent edge portion of said sill, said apron having a planar configuration and being in substantially planar perpendicular relationship to said main or body section, and a pair of jamb trim components, each of said jamb trim components having a panel portion for covering disposition of corresponding portions of said jambs, each said panel portion being directed toward the opening of said window and being presented in upstanding relationship to the main or body section of said sill trim component, each said panel portion having a base extension projecting from said panel portion inwardly from the corresponding jamb member toward the opposite panel portion in overlying relation to the adjacent portion of the main or body section of said sill trim component, each base extension including a skirt integral with said base extension extending over the proximate portion of said apron of said sill trim component in covering disposition, and means securing together said sill trim component and jamb trim components.

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**4,391,073**

**MOVABLE PANEL ASSEMBLY**

**Lloyd C. Mollenkopf, Akeley, and Daniel J. Branson, Prior Lake, both of Minn., assignors to Rosemount Office Systems, Inc., Lakeville, Minn.**

**Filed Dec. 12, 1980, Ser. No. 215,692**

**Int. Cl.³ G01K** *11/04;* **E04B** *2/82;* **E04H** *5/00*

**U.S. Cl. 52—241** **6 Claims**

1. A movable panel assembly comprising a frame defining a perimeter and including generally vertical frame members and a generally horizontal lower frame member:

support means operable to hold said frame members in an assembly defining an interior space;

said vertical frame members comprising channel shaped members having a base and side walls, the sidewalls having inturned ends spaced from the base and defining an opening facing away from the space defined by the perimeter frame;

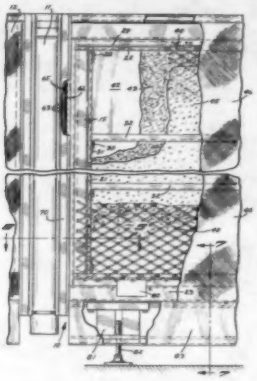
sheet means extending across said space to form a support resisting forces perpendicular to the plane of the perimeter frame;

a layer of fabric over said sheet means;

retainer means on each of the edges of the frame members comprising a plurality of teeth extending in direction relative to the frame so that edge portions of the fabric layer placed over the teeth under tension are retained by the teeth, and

a pair of support feet mounted on the lower horizontal frame member, a raceway having a lower wall and hingedly

attached side walls, means to mount the lower wall of the raceway to the support feet with the raceway side walls extending upwardly to position adjacent the lower frame member to form an enclosure in cooperation with the lower frame member, said raceway side walls having



inturned side edges adjacent the lower frame member, and cooperating grooves and lip means acting between the inturned edges of the raceway sidewalls and the support feet to releasably retain the raceway sidewalls uprightly on the support feet.

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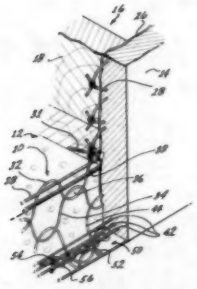
**4,391,074**

## WEEP SCREED

**Henrietta H. Holsman, 101 Ocean Ave., Apt. B7, Santa Monica, Calif. 90402**

**Filed Jan. 8, 1981, Ser. No. 223,309**
**Int. Cl.³ E04B *1/00***
**U.S. Cl. 52—367** **34 Claims**



1. In combination in a weep screed for providing a reinforcement for stucco at or near the foundation plate line of a building,

a first lattice network disposable against the wall of the building before the addition of stucco to the building and including undulating wires disposed in overlapping relationship for receiving and reinforcing the stucco and including line wires extending across the undulating wires to define overlapping relationships with the undulating wires, and

a second lattice network extendable from the wall of the building in transverse relationship to the first lattice network before the addition of stucco to the building and disposed in a horizontal relationship and including undulating wires disposed in overlapping relationship for receiving and reinforcing the stucco and including line wires extending across undulating wires to define overlapping relationships with the undulating wires, and

the second lattice network including undulating wires extending into the first lattice network to provide a continuation between the first and second lattice networks.

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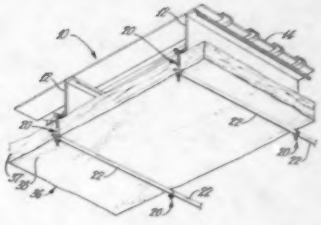
**4,391,075**

## INSULATED ROOF STRUCTURE

**Dwight S. Musgrave, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio**

**Filed Nov. 3, 1980, Ser. No. 202,989**
**Int. Cl.³ E04B *1/74, 5/57***
**U.S. Cl. 52—404** **13 Claims**



1. An insulated roof structure (10) comprising a plurality of parallel, spaced main support beams (18), a plurality of parallel, horizontally extending auxiliary support beams (12) spaced apart from each other and supported by and extending transversely of the main support beams (18), the auxiliary support beams (12) each having a lower upstanding flange, a plurality of roof panels (14) mounted in covering relationship to the auxiliary support beams (12), a plurality of hangers (20) mounted in spaced relationship along each of the auxiliary support beams (12) between each pair of adjacent main support beams (18), each hanger (20) including an upper hook portion (28) in cooperative engagement with the lower upstanding flange of an auxiliary support beam (12), a plurality of elongated support members (22) hung on each of the auxiliary support beams (12) in alignment with each other and parallel to the auxiliary support beams (12), the support members (22) being cooperatively engaged with and suspended by the hangers (20), and insulation strips (36) strung over the support members (22) transversely of the auxiliary support beams (12).

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**4,391,076**

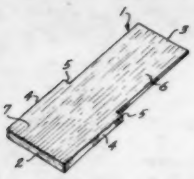
## ROOF OR SIDEWALL CONSTRUCTION

**Stewart Ferguson, P.O. Box 12, Aloha, Wash. 98525**

**Continuation-in-part of Ser. No. 59,998, Jul. 23, 1979. This application Apr. 13, 1981, Ser. No. 253,495**
**The portion of the term of this patent subsequent to Oct. 20, 1998, has been disclaimed.**
**Int. Cl.³ E04D *1/00***
**U.S. Cl. 52—553** **24 Claims**

1. In a covering for a surface of a building structure, such covering including separate generally rectangular covering elements having respective butt and tip ends and applied in generally coplanar, side adjacent relationship in each of several courses with the tip portions of the covering elements of one course being overlapped by the butt portions of the covering elements of a higher course, the improvement comprising a filler element having respective butt and tip ends, at least one side of said filler element having a shoulder extending transversely of such side and dividing said filler element into a wide

tip portion and a narrower butt portion, said filler butt portion being fitted between the adjacent sides of adjacent covering elements in a course and said shoulder abutting the tip end of one of such adjacent covering elements.



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4,391,077

## METHOD OF CONSTRUCTING A BUILDING SYSTEM

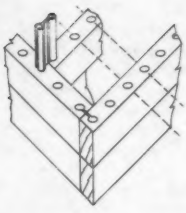
Hans J. Giess, Rotorua, New Zealand, assignor to Fletcher Timber Limited, Auckland, New Zealand

Continuation of Ser. No. 100,976, Dec. 6, 1979, abandoned. This application Jul. 14, 1981, Ser. No. 283,144

Claims priority, application New Zealand, Dec. 8, 1978, 189128

Int. Cl.³ E04B *1/10*

U.S. Cl. 52—747 4 Claims



1. A method of constructing an essentially one component thick structure of substantially planar walls from contiguous lengths of plank-like building components comprising the steps of producing a plurality of equally spaced parallel holes through each said component, producing slots through each component parallel to said holes and extending from an outer surface of said component where a contiguous component is to be joined to the hole adjacent thereto, placing at least one of said components in position for construction, providing an elongated joining member having the cross-sectional shape of a straight shank with elongated bulbous ends, the dimensions of said shank and bulbous ends being such as to provide a snug sliding fit in said slot and holes respectively, inserting said joining member into at least one of said holes and slot with said shank and one bulbous end in said slot and hole respectively, said joining member also being dimensioned so that when inserted into said hole and slot substantially half of the cross-section of said joining member extends from said component and the length of said joining member extends substantially parallel to the central axis of said hole for a distance comparable to at least one-half the length of said hole, positioning another component with respect to said construction position with the hole and slot thereof in aligned engagement with the extending end of said joining member, sliding said another component into abutting engagement with said first positioned component using said joining member as a guide, inserting wooden dowels into said holes in said another component which are aligned with said holes in previously positioned adjacent components, said dowels having a diameter to provide a snug fit with said holes and a length no greater than the length of a hole, driving said dowels into said aligned holes to effectively provide shear resistance in the finished structure, and continuing said process of assembling and connecting said components until said structure is completed.

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4,391,078

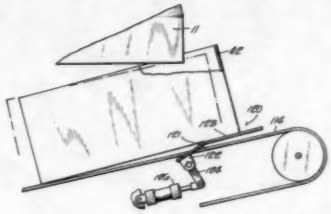
## LOADING BLADES FOR PACKAGING APPARATUS

Biagio J. Nigrelli, Kiel, Wis., assignor to Nigrelli Corporation, Kiel, Wis.

Division of Ser. No. 112,589, Jan. 16, 1980, Pat. No. 4,332,121. This application Nov. 25, 1981, Ser. No. 325,066

Int. Cl.³ B65B *5/04*

U.S. Cl. 53—251 2 Claims



1. In a case loader having an article conveyor for moving articles along support means having an upper surface defining a first plane, a case conveyor located beneath the article conveyor and in which the case conveyor path merges upwardly into the conveying path of the article conveyor from below, the improvement wherein said case conveyor includes two spaced parallel conveyor runs separated by a gap and a case displacement lever, and means for supporting and operating said lever for pivotal movement between an advanced position extending in said gap between said conveyor runs to engage the under surface of a carton and raise a portion of the carton above said first plane and above the bottom of an article carried on said article conveyor to intercept the leading end of an article carried on said conveyor to insure engagement of the leading edge of said carton with the article being loaded and to minimize the distance the articles must fall into the case and said means for supporting and operating said lever affording movement of said lever to retracted position below said first plane to afford movement of the filled case from said case conveyor.

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4,391,079

## CONTROL SYSTEM FOR CYCLIC MACHINES

Dale M. Cherney, Howards Grove, Wis., assignor to Hayssen Manufacturing Company, Sheboygan, Wis.

Filed Aug. 21, 1980, Ser. No. 180,039

Int. Cl.³ B65B *41/18;* B31B *1/10;* G05B *19/28;* G06F *15/46*

U.S. Cl. 53—396 15 Claims

1. The method of controlling apparatus for sealing packages wherein a web of flexible packaging material having a series of registration marks is formed into tubing and fed past sealing means for sealing the tubing to form packages, comprising:

presetting a predetermined delay length of tubing to be fed past the sealing means;

initiating web feeding;

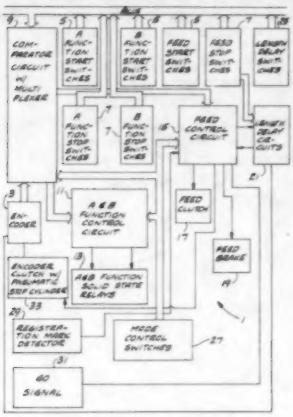
detecting a registration mark;

feeding said predetermined delay length past the sealing means in response to said detection of a registration mark before sealing of the tubing, said predetermined delay length being substantially independent of the rate at which packaging material is fed past the sealing means;

determining when the predetermined delay length of tubing has passed the sealing means after detection of said registration mark;

stopping the feeding of material past the sealing means in

response to said predetermined delay length's having passed the sealing means;




actuating the sealing means; and reinitiating feeding of the web.

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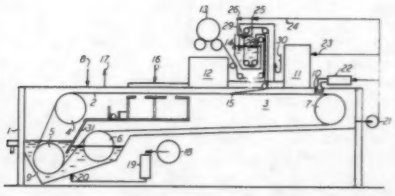
**4,391,080**

## METHOD FOR PROVIDING AN INERT STERILE ATMOSPHERE IN AN ASEPTIC PACKAGING MACHINE

**Aaron L. Brody, Dunwoody; Joseph J. Embro, Atlanta, both of Ga., and William E. Young, Neptune, N.J., assignors to The Mead Corporation, Dayton, Ohio**

**Filed Sep. 20, 1979, Ser. No. 76,932**
**Int. Cl.³ B65B** *55/10*
**U.S. Cl. 53—426** **6 Claims**



1. In a method for providing a sterile inert atmosphere in an aseptic packaging machine whereby inert gas is supplied to the interior of the machine and wherein preformed flanged containers are introduced into said interior through a sterilant bath, then filled by a filler means and thereafter covered with a cover material which is supplied through another sterilant bath, the improvement whereby said inert gas is introduced into the interior of said machine by sparging said gas into and through said container sterilant bath, and a portion of said gas is withdrawn from said interior, divided into three parts and delivered to (i) said containers for drying the flange areas thereof prior to filling and sealing, (ii) to said filler means to aid in the operation thereof and to provide a microbiological barrier therefor, and (iii) to said cover material as it emerges from said other sterilant bath for removing residual sterilant.

**4,391,081**

## METHOD OF AND APPARATUS FOR FORMING, FILLING AND SEALING PACKAGES

**Lloyd Kovacs, Sheboygan, Wis., assignor to Hayssen Manufacturing Company, Sheboygan, Wis.**

**Filed Sep. 8, 1980, Ser. No. 185,209**
**Int. Cl.³ B65B** *1/24, 9/06*
**U.S. Cl. 53—436** **14 Claims**

1. The method of forming, filling and sealing packages comprising forming a flexible packaging material into tubing, the tubing extending downwardly, feeding the tubing downwardly and transversely sealing it at package length intervals, and delivering a quantity of the product with which the packages are to be filled into the tubing during an interval of time between successive sealing operations, the transverse seals being formed by a pair of sealing members movable relative to one another between an open position and a closed position in sealing engagement with the tubing, and, with the sealing members open and after the delivery of the product into the tubing and before the next seal is made, squeezing the tubing above the sealing members by positively moving a pair of stripper members relative to one another independently of the movement of the sealing members from an open position to a closed position wherein the stripper members are closely adjacent one another on opposite sides of the tubing in engagement with the tubing above the sealing members, then holding the stripper members in their closed position while moving them generally straight down on the tubing between the sealing members from above to below the sealing members, thereby to compact the product in the tubing below the level of the next seal to be made, closing the sealing members on the tubing above the stripper members, and then opening the stripper members and the sealing members and moving the stripper members up between the sealing members returning them to their open position.

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**4,391,082**

## SLIDE MOUNTER WITH FILM CURL ACCOMMODATOR

**Robert E. Diesch, Rogers, Minn., assignor to Pako Corporation, Minneapolis, Minn.**

**Filed Nov. 6, 1980, Ser. No. 204,555**
**Int. Cl.³ B65B** *61/00, 63/00*
**U.S. Cl. 53—520** **16 Claims**

1. Apparatus for mounting a film transparency in a slide mount, said slide mount having opposing portions defining a plane therebetween, the apparatus comprising:

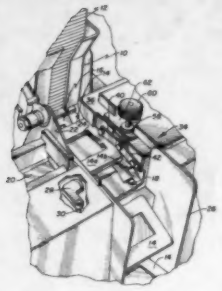
means for partially inserting a film transparency, while attached to a film web, into the slide mount;

means for severing the transparency from the web at a position outside the slide mount;

means for engaging the transparency to fully insert the transparency into the slidemount; and

means for bowing both portions of the slide mount in the

same direction relative to said p'ane about an axis parallel to the direction of transparency insertion to match a curl



in the transparency as the transparency is fully inserted into the slide mount.

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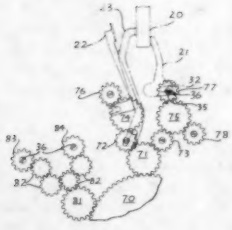
**4,391,083**

## PACKING MACHINE

**Austin L. Fox, London, England, assignor to Molins Limited, London, England**

**Filed Jun. 27, 1980, Ser. No. 163,457**
**Int. Cl.³ B65B *19/24***
**U.S. Cl. 53—575** **9 Claims**



1. A packing machine comprising:

(a) a movable carrier;

(b) a plurality of packet-forming assemblies mounted on said movable carrier, each assembly comprising a stationary member and at least one operating member mounted for movement towards and away from said stationary member;

(c) means for moving said carrier intermittently along a path so that each of said assemblies stops successively at each of a plurality of stations; and

(d) means for positively driving said at least one operating member of each of said assemblies to progressively move said operating member towards and away from said stationary member, said driving means comprising at least one coupling shaft rotatably mounted on said movable carrier and operatively connected to said at least one operating member, said coupling shaft extending transverse to the directional movement of said assembly along said path between successive stations, and at least one rotatably mounted driving shaft at each of a selected plurality of said stations where at least one operating member of each of said assemblies is to be moved, said at least one driving shaft at each of said selected stations being so located that when each of said assemblies is stopped at each of said selected stations said at least one driving shaft is in axial alignment with said at least one coupling shaft on said movable carrier, the end of one of said shafts having at least one tongue and the end of the other of said shafts having at least one corresponding slot, said tongue and slot being arrangedto engage each other to provide a drive connection therebetween when said driving and coupling shafts are in axial alignment.

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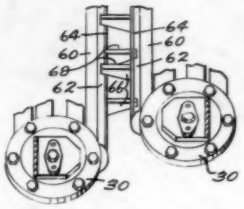
**4,391,084**

## TOBACCO DEFOLIATING UNITS WITH OVERLAPPING CUTTING EDGES

**Robert W. Wilson, Charlotte, N.C., assignor to Powell Manufacturing Company, Inc., Bennettsville, S.C.**

**Filed Jan. 28, 1982, Ser. No. 343,524**
**Int. Cl.³ A01D *45/16***
**U.S. Cl. 56—27.5** **4 Claims**



1. In an apparatus for priming tobacco plants having stalks and leaves extending outwardly therefrom comprising a vehicle frame movable along a row of tobacco plants, a pair of intermeshing defoliating units, means mounting said units on said frame in spaced side-by-side relation for vertical adjustment together with respect to said frame, each of said defoliating units including a forward rotary element mounted on said frame for rotation about a first axis, a rearward rotary element mounted on said frame in a position spaced rearwardly and upwardly with respect to said forward rotary element for rotation about a second axis parallel to said first axis, a plurality of elongated members extending between said rotary elements, means mounting the forward ends of said elongated members on said forward rotary element for rotational movement about axes parallel to said first axis and spaced circumferentially thereabout, means mounting the rearward ends of said elongated members on said rearward rotary element for rotational movement about axes parallel with said second axis and spaced circumferentially thereabout, each of said elongated members including cutting blade means thereon having sharp upper cutting edges extending generally in directions both longitudinal and transverse with respect to the row of plants, the transverse extent of the cutting edges of each unit being in a direction toward the other and in longitudinally intermeshing relation therewith, and driven means operatively connected with at least one rotary element of each unit for rotating said element and effecting an orbital translational movement of the elongated members of each unit in a direction such that the cutting edges of each elongated member will be moved inwardly toward the stalks, upwardly to sever the leaves from the stalks and then outwardly to carry the severed leaves away from the stalks, the improvement which comprises

the longitudinal extent of the cutting edges associated with the elongated members of each unit during their movement inwardly toward the stalks passing into a common vertical plane disposed closely adjacent the associated side of the stalks of a row of tobacco plants along which the vehicle frame is moved so as to insure that leaves attached to stalks at positions adjacent opposite sides thereof with respect to the row will be severed,

the distance between the aforesaid vertical planes associated with both units being less than the transverse extent of the cutting edges of said units so that the free ends of the transverse extent of the cutting edges of each elongated member associated with each unit during their movement

inwardly toward the stalk moves inwardly a distance beyond the vertical plane associated with the other unit so as to insure that leaves attached to stalks at positions other than at opposite sides thereof with respect to the row will be severed.

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**4,391,085**

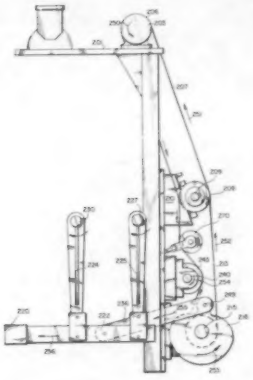
## GRAPE HARVESTER

**Robert H. Harris, Indianapolis; Troy G. Humphrey, Beech Grove, and John J. Stimson, Jr., Indianapolis, all of Ind., assignors to Labeco Harvesters, Inc., Fresno, Calif.**

**Continuation-in-part of Ser. No. 120,542, Feb. 11, 1980, Pat. No. 4,299,081. This application Nov. 9, 1981, Ser. No. 319,698**

**Int. Cl.³ A01D** *46/26, 46/28*

**U.S. Cl. 56—330** **9 Claims**



**1.** A harvester comprising:

frame means operable to move along in straddling fashion a row of plants having growing items thereon and including a receptacle to catch said items falling from said plants;

a head pivotally mounted on said frame means to pulsate said plants to cause items growing thereon to fall therefrom into said receptacle, said head including:

a frame pivotally mounted to said frame means and having a pair of downwardly extending spaced apart supports forming a channel through which said row of plants may pass;

a pair of horizontally movable arms mountable to said supports with spaced apart distal ends positionable on opposite sides of said row of plants;

driving means mounted on said frame and operatively associated with said arms to reciprocate said arms back and forth against said plants while limiting movement of one arm to approximately the same horizontal direction of movement as the other arm, said driving means including first and second crank shafts rotatably mounted about an axis of rotation on said frame, a source of energy having a rotatable output operatively driving said first and second crank shafts which are connected to said arms maintaining a constant spacing between said distal ends as said arms are reciprocated by said driving means, said arms including at least a pair of links with top ends pivotally mounted to said frame and bottom ends pivotally connected to said arms suspending said arms therefrom and allowing a swinging arc movement of said arms in response to said driving means and independent of pivotal movement of said frame, said distal ends being rigid members extending in the direction of said row of plants;

counterweight means including a first and a second off centered counterweights respectively on said first and second crank shaft rotatably mounted on said frame, said counterweight means being operable to provide a vibration neutralizing force in a direction opposite of the direction of movement of said arms; and

timing means operatively associated with said first and second off centered counterweights along with said first and second crank shafts being operable to rotate said counterweights about said axis of rotation but in a direction opposite of the crank shaft upon which each counterweight is mounted dampening vibration imparted to said frame by said arms.

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**4,391,086**

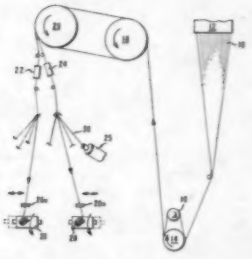
## APPARATUS FOR RESTRINGING MULTIPLE THREADLINES

**Charles H. Doherty, III, Nashville, Tenn., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.**

**Continuation-in-part of Ser. No. 237,615, Feb. 24, 1981, abandoned. This application Mar. 15, 1982, Ser. No. 357,856**

**Int. Cl.³ B65H** *69/06;* **D02J** *1/08*

**U.S. Cl. 57—22** **4 Claims**



**1.** In a machine for processing multiple threadlines moving in a path from a supply source to a windup, an apparatus for stringing an unstrung threadline of said multiple threadlines that includes a jet adjacent said threadlines for interlacing the unstrung threadline with a moving threadline comprising: a forwarding jet located downstream of the interlacing jet, said forwarding jet having an inlet and an outlet through which said multiple threadlines pass in said path, said forwarding jet having a coanda surface located at its outlet; a suction device located below said coanda surface; a first elongated guide pin located across the threadline path contacting the moving multiple threadlines adjacent the outlet of the forwarding jet; and a second elongated pin having a notch in its surface at its center pivotally mounted at the outlet of the forwarding jet for swinging movement from a location below said coanda surface and above said suction device past said suction device to a location between the outlet of the forwarding jet and said first guide pin and above and across the threadline path.

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**4,391,087**

## TWISTING APPARATUS

**Aloys Greive, Münster; Aloys Horstmann, Greven, and Wilhelm Stupirak, Münster, all of Fed. Rep. of Germany, assignors to Volkmann GmbH & Co., Krefeld, Fed. Rep. of Germany**

**Filed Apr. 16, 1981, Ser. No. 254,764**

**Claims priority, application Fed. Rep. of Germany, Apr. 18, 1980, 3015044**

**Int. Cl.³ D01H** *1/10, 7/86*

**U.S. Cl. 57—58.52** **10 Claims**

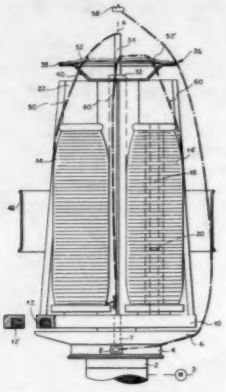
**1.** A twisting apparatus comprising:

a spindle extending along an upright axis, having an upper end and a rotatable lower end, and formed with a passage opening axially upwardly at said upper end and radially outwardly at said lower end;

means for rotating said spindle about said axis;

a bobbin support rotatably carried on said spindle between said ends thereof and provided with a plurality of bobbin

holders spaced about and radially offset from said axis and each adapted to support a respective bobbin carrying a respective yarn, whereby said yarns can be led down through said passage and up around said bobbin support while said spindle is rotating to wind said yarns together and form a balloon around said support; and



means for preventing rotation of said support about said axis even while said spindle is rotating, said bobbin holders being angularly equispaced about and radially equispaced from said axis, said bobbin holders number four, including two for main bobbins and two for the reserve bobbins, the holders for said main bobbins being diametrally opposite each other and alternating with the holders for said reserve bobbins.

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**4,391,088**

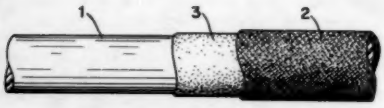
## STRING FOR SPORTS RACKETS

**Jerome Salsky, Emerson, N.J.; Patrick K. Janis, Oak Park, Ill., and Kenneth E. Branen, Nashua, N.H., assignors to United States Tennis Gut Association, Inc., Emerson, N.J.**

**Filed Jan. 13, 1982, Ser. No. 339,082**

**Int. Cl.³ D02G** *3/04, 3/10, 3/38, 3/40*

**U.S. Cl. 57—234** **15 Claims**




1. A string for sports rackets consisting of a gut core covered with filamentary aramid and impregnated with at least one coating of water-resistant, vapor-impermeable, wear-resistant, flexible smooth adhesive polymeric resin.

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**4,391,089**

## APPARATUS FOR PIECING-UP A WRAP YARN

**Werner Billner, and Erich Bock, both of Ingolstadt, Fed. Rep. of Germany, assignors to Schubert & Salzer, Ingolstadt, Fed. Rep. of Germany**

**Filed May 22, 1981, Ser. No. 266,588**

**Claims priority, application Fed. Rep. of Germany, May 31, 1980, 3020726**

**Int. Cl.³ D01H** *15/00;* **D02G** *3/36*

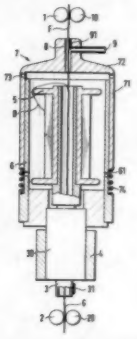
**U.S. Cl. 57—261** **6 Claims**

1. Apparatus for piecing-up a wrap yarn being produced from a bundle of spinning fibers and a wrapping thread on a wrapping device, a hollow spindle forming part of said wrapping device, a bobbin of said wrapping thread carried on said hollow spindle, a pair of delivery rolls for feeding said bundle of spinning fibers to said hollow spindle and a pair of takeup rolls for drawing off said wrap yarn out of said hollow spindle, a housing concentrically surrounding said bobbin, a jacket forming part of said housing having openings for the passage of air, and a suction duct arranged between said pair of delivery rolls and said hollow spindle comprising:

a closing element associated with said openings for selectively closing and opening during piecing-up of said yarn;

said closing element being a pot inverted over said housing, a fiber feed channel extending through said pot in axial alignment with said hollow spindle, said suction duct opening into said feed channel, and said pot being telescopically displaceable during piecing-up in the direction of said pair of takeoff rolls to an extent such that it covers said openings.

2. A method for piecing-up a wrap yarn being produced from a bundle of spinning fibers and a wrapping thread by



means of a wrapping device comprising a hollow spindle carrying a bobbin of said wrapping thread and arranged between a pair of delivery rolls for feeding said bundle of spinning fibers to said hollow spindle and a pair of take-off rolls for drawing off said wrap yarn out of the hollow spindle, a housing concentrically surrounding said bobbin, a jacket forming part of said housing having openings for the passage of air, and a suction duct arranged between said pair of delivery rolls and said hollow spindle, comprising the following steps:

stopping said wrapping device;

producing an eddy of air in said housing by an airflow through said openings for seeking and exposure of a free end of said wrapping thread on said bobbin;

introducing an end of said wrap yarn withdrawn from a yarn bobbin into said hollow spindle, and

producing a concentrated suction air stream in said housing by closing said openings for delivering back said ends of said wrap yarn and said wrapping thread into said suction duct.

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**4,391,090**

## DEVICE FOR PNEUMATICALLY THREADING A YARN IN A DOUBLE TWIST SPINDLE

**Simon Charbonnier, Lyons, France, assignor to Verdol S.A., Caluire, France**

**Filed Oct. 6, 1981, Ser. No. 308,969**

**Claims priority, application France, Nov. 3, 1980, 80 23666**

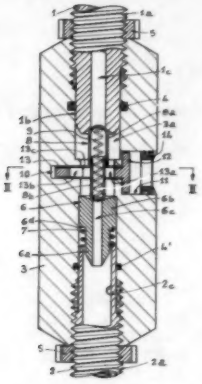
**Int. Cl.³ D01H** *15/00, 7/86*

**U.S. Cl. 57—279** **5 Claims**

1. A pneumatic yarn threading device for a double twist spindle having a hollow central shaft with a yarn brake therein, and having means operative when the shaft is pneumatically pressurized for introducing yarn through its bore past the brake, wherein the device comprises:

(a) a shaft comprising axially aligned mutually-spaced tubular portions joined together by a central portion having an axial bore of diameter larger than the bores of said tubular portions, the tubular portions having opposed ends facing each other across the bore of the central portion, and the central portion having a transverse passage extending thereacross between the tubular portions;

(b) a yarn brake comprising an elongated capsule in the bore of the central portion and having opposed ends which are disposed in a first axially aligned position to abut said opposed ends of the tubular portions and close their bores, and the capsule in a second displaced position being offset from axial alignment to expose the bores at said opposed ends to permit yarn to be passed therethrough; and



(c) means for controlling the position of the capsule comprising piston means slidably mounted in said transverse passage and having an opening therethrough receiving said capsule, the opening being larger in diameter than the capsule; yieldable spring means urging the capsule and the piston means normally to occupy a first position wherein the capsule is axially aligned with and closes the bores of the tubular portions; and one side of the piston means being pneumatically coupled to the bore of the central portion and operative when the hollow shaft is pressurized to displace the piston means and move the capsule to said second displaced position, whereby yarn can pass through said bores and the opening of the piston means for threading the double twist spindle.

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**4,391,091**

## FALSE TWISTING APPARATUS AND METHOD

**Hellmut Lorenz, Remscheid-Lennep, Fed. Rep. of Germany, assignor to Barmag Barmer Maschinenfabrik AG, Remscheid, Fed. Rep. of Germany**

**Filed Jun. 12, 1981, Ser. No. 273,196**

**Claims priority, application Fed. Rep. of Germany, Mar. 17, 1981, 3110242; May 9, 1981, 3118410**

**Int. Cl.³ D02G *1/08***

**U.S. Cl. 57—340** **20 Claims**

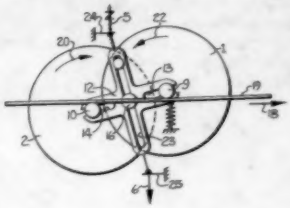
1. A yarn false twisting apparatus comprising

a frame,

a pair of twist imparting discs, with each disc being mounted to a supporting shaft and having a yarn engaging friction surface on one face thereof,

means mounting said discs to said frame and including a carrier plate mounting said shafts for rotation about essentially parallel, spaced apart axes and such that portions of the respective yarn engaging friction surfaces are disposed in opposing relationship and define a twisting zone therebetween;

drive means for rotating each of said discs in opposite rotational directions, said drive means including a whorl mounted to each of said shafts, and an endless drive belt rotatably mounted to said frame so as to have a run contacting opposite surfaces of said whorls and thereby rotate the same in opposite directions,



whereby a yarn may be continuously moved through said twisting zone in a direction extending perpendicular to the plane defined by said axes of rotation and so as to have twist imparted thereto by frictional contact between the yarn and the respective opposed friction surfaces.

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**4,391,092**

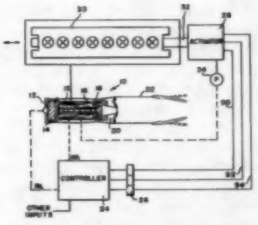
## MULTIPLE POSITION DIGITAL ACTUATOR

**Samuel E. Arnett, South Bend, Ind., assignor to The Bendix Corporation, Southfield, Mich.**

**Filed Jul. 30, 1980, Ser. No. 173,531**

**Int. Cl.³ F02C *9/18***

**U.S. Cl. 60—39.29** **11 Claims**



1. A multiposition actuator for changing a N-bit digital word into N physical positions of an actuator element comprising:

N-1 telescoped open ended cylinders mounted in an open ended bore with the open ends of said cylinders disposed toward the closed end of said bore and an end cap closing the open end of said bore;

said actuator element including an elongated body passing through an aperture in the closed end of said bore and having a flange being a double acting piston disposed within the innermost cylinder;

said actuator element, cylinders and end cap forming N piston cylinder combinations wherein the piston area of each successive piston increases from the innermost combination to the outermost combination, and wherein the flange piston area disposed toward the closed end of the bore is less than the flange piston area for the innermost cylinder;

each of said combinations operable to move said actuator element independently of the other combinations through a distance controlled by an expandable chamber disposed between the cylinder and piston of each combination, each distance being related to the other distances by powers of the numeral 2;

N pilot solenoids, each associated with an expandable chamber and operable to control means for communicating a

source pressure to a corresponding chamber and the source pressure from a corresponding chamber to a reference pressure and each associated with one of the bits of said digital input and actuated by one of the states of said bit;

a bias chamber defined by the open ends of said cylinders and the closed end of said bore;

means for communicating said source pressure to said bias chamber such that movement of the expandable chambers is accomplished by the force difference between the pistons because of the source and reference pressures acting over the differing piston areas.

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**4,391,093**

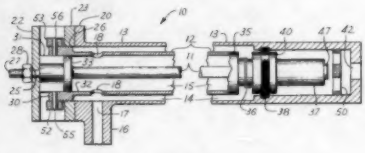
## TEMPERATURE-RESPONSIVE ACTUATOR

**William K. Gulick, Glendale, Ohio, assignor to General Electric Company, Cincinnati, Ohio**

**Filed Jun. 29, 1981, Ser. No. 278,922**

**Int. Cl.³ F02C 7/042**

**U.S. Cl. 60—39.29** **8 Claims**



**1**. A temperature-responsive actuator comprising:

a support member;

a spaced pair of thermally expandable members extending longitudinally in parallel alignment, one of said expandable members having one end fixedly connected to said support member and an opposite end connected to a corresponding end of the other expandable member;

means directing a flow of fluid into contact with both said expandable members; and

means restricting the flow of said fluid into contact with one of said expandable members in a first mode of operation and enabling relatively unrestricted flow of said fluid in contact therewith in a second mode of operation;

whereby said one expandable member expands longitudinally in one direction during said first mode and the other of said expandable members expands longitudinally in an opposite direction during said second mode for retracting said one expandable member.

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**4,391,094**

## DESTRUCTABLE AIR INLET COVER FOR ROCKET ENGINES

**Herbert Engel, Munich, and Horst Boettger, Zorneding, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bölkow-Blohm Gesellschaft mit Beschränkter Haftung, Fed. Rep. of Germany**

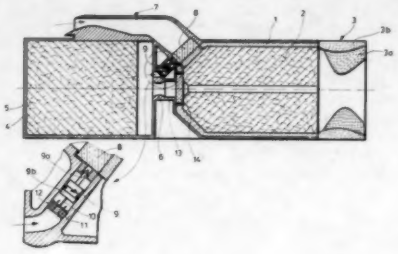
**Filed Jan. 16, 1981, Ser. No. 225,607**

**Claims priority, application Fed. Rep. of Germany, Jan. 29, 1980, 3003004**

**Int. Cl.³ F02K 7/10, 9/08**

**U.S. Cl. 60—245** **5 Claims**

**5**. A movable air inlet control device for a ram jet engine which includes a precombustion chamber connected through a flow passage to a main combustion chamber which has an inlet having a breakable cover closing said inlet which may be broken to permit air to enter into said main combustion chamber for combustion, comprising a tubular connection between said air inlet passage and said precombustion chamber, a striker device movable in said tubular connection, means for exposing said striker device to the pressure of said precombustion chamber so as to effect movement of said striker device to destroy



said cover and open said air inlet on the occurrence of a predetermined pressure in said precombustion chamber.

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**4,391,095**

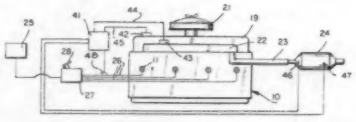
## INTERNAL COMBUSTION ENGINE WITH EXHAUST FILTER REJUVENATION

**Kashmir S. Virk, Hopewell Junction, N.Y., assignor to Texaco Inc., White Plains, N.Y.**

**Filed Jul. 2, 1981, Ser. No. 279,913**

**Int. Cl.³ F01N 3/02**

**U.S. Cl. 60—286** **7 Claims**



**1**. In a multi-cylinder internal combustion engine **10** having a plurality of cylinders **12**, and a primary fuel injection system including a fuel injector **11** communicated with each of said cylinders **12** to inject a primary liquid fuel charge thereto,

intake **17** and exhaust valve **18** sets communicated with each of said cylinders **12**, said valve sets being operable between opened and closed positions when the engine is functioning,

a valve override means **41** engaging the intake valve **17** in at least one of said cylinders **12** and being operable to maintain said intake valve **17** in closed position whereby to immobilize said at least one cylinder during a period of engine operation,

power control means communicated with said valve override means and with said primary fuel system, and being operable to discontinue fuel flow to said at least one cylinder when the latter is in immobilized mode,

an exhaust gas filter **24** communicated with the respective engine exhaust valves **18** to receive a stream of hot exhaust gas therefrom,

an exhaust gas filter rejuvenation system including: supplementary fluid fuel injector means communicated with a source of supplementary fuel and being operable to controllably inject an amount of said supplementary fluid fuel into an immobilized cylinder **12** when said cylinder is in immobilized mode.

4,391,096

## HYDRODYNAMIC REVERSING TRANSMISSION

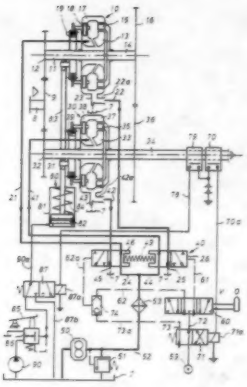
Erich Polzer; Gottfried Ruetz, both of Heidenheim; Hubert Schmölz, Nattheim, and Remy Pochon, Heidenheim, all of Fed. Rep. of Germany, assignors to Voith Getriebe KG, Heidenheim, Fed. Rep. of Germany

Filed Dec. 15, 1980, Ser. No. 216,554

Claims priority, application Fed. Rep. of Germany, Mar. 20, 1980, 3010661

Int. Cl.³ F16D 33/00

U.S. Cl. 60—335 12 Claims



1. A hydrodynamic reversing transmission, particularly for use in earth moving and like vehicles, comprising rotary input means; reversible rotary output means; forward and reverse drive trains connecting said input means with said output means and respectively including first and second hydrodynamic starting torque converters respectively comprising first and second working circuits which are respectively rendered operative and ineffective, also within the counterbraking range, in response to admission and evacuation of working fluid, each of said circuits including a stationary housing, a turbine wheel designed for substantially centrifugal flow of fluid therethrough and means for influencing the torus stream in the respective circuit; a source of pressurized working fluid; a sump; first and second filling lines connecting said source with the respective circuits; first and second draining lines having inlet portions connected with the respective housings and outlet portions discharging into said sump; and reversing means for regulating the flow of fluid in said lines so that said first filling line delivers fluid from said source to said first circuit and said first draining line is sealed when said second filling line is sealed from said source and said second draining line is open, and vice versa, said inlet portions having permanently open apertures for evacuation of some fluid from the respective housings, said apertures being arranged to admit working fluid into said sump and said inlet portions being disposed in the regions of outflow of fluid from the respective turbine wheels, the orientation of said inlet portions being such that the direction of fluid flow therein coincides, at least substantially, with the direction of fluid flow toward said inlet portions within said counterbraking range.

4,391,097

## PUMPING UP HYDROELECTRIC POWER PLANT

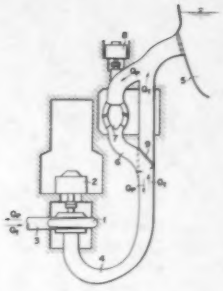
Sachio Tsunoda, Yokohama, and Kaneo Sugisita, Ayase, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kanagawa, Japan

Filed Nov. 4, 1980, Ser. No. 204,036

Claims priority, application Japan, Nov. 7, 1979, 54/143291

Int. Cl.³ F16D 31/02

U.S. Cl. 60—398 4 Claims



3. A pumping up hydroelectric power plant structure comprising a main pump/turbine having a draft tube, a booster pump provided in said draft tube, so that said booster pump is operated in series with said main pump/turbine during the pumping operation of the pump/turbine, and a power system for operating the main pump/turbine and booster pump, said main pump/turbine and said booster pump being constructed to satisfy relations

$$(K_1/K_2)\,(y_2/y_1) \approx 1.0$$

and

$$0.71 \leq K/K \leq 1.42$$

wherein

$K_1$: time constant of the rotating part of the pump/turbine

$K_2$: time constant of the rotating part of the booster pump,

$\bar{y}_1$: average torque exerted to the rotating part of the pump-/turbine,

$\bar{y}_2$: average torque exerted to the rotating part of the booster pump,

so that when the main pump/turbine and booster pump are simultaneously disconnected from the power system, the rotating speeds of each pump are simultaneously reduced to zero.

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4,391,098

## TURBO-COMPOUND INTERNAL COMBUSTION ENGINE

Hideaki Kosuge, Hayama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Sep. 8, 1981, Ser. No. 300,115

Claims priority, application Japan, Sep. 17, 1980, 55-132519

Int. Cl.³ F02B 37/00

U.S. Cl. 60—602 4 Claims

1. In a engine system including a internal combustion engine equipped with a turbo-charger and an auxiliary turbine integrated with said engine, the combination comprising:

an exhaust passage leading from a combustion chamber of said engine to a turbine of said turbo-charger;

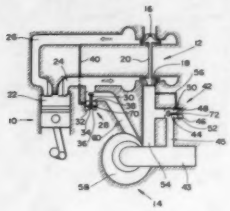
a transfer passage leading from the turbo-charger turbine to a scroll of said auxiliary turbine;

a first by-pass passage leading from said exhaust passage to said scroll;

a second by-pass passage leading from said transfer passage to an exhaust conduit of said engine;

a first waste gate responsive to the discharge pressure of a compressor of said turbo-charger which controls the communication between said exhaust passage and said first by-pass passage, said first waste gate being adapted to open upon the discharge pressure of said turbo-charger compressor reaching a first predetermined value;

a second waste gate responsive to the pressure prevailing in



said transfer passage which controls the communication between said second by-pass passage and said transfer passage, said second waste gate being adapted to open upon a second predetermined pressure prevailing in said transfer passage; and

means defining first and second passages within said scroll which exclusively communicate with said first by-pass passage and said transfer passage, respectively.

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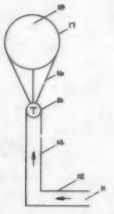
**4,391,099**

## ATMOSPHERIC THERMAL ENERGY CONVERSION UTILIZING INFLATABLE PRESSURIZED RISING CONDUIT

**Jens O. Sorensen, P. O. Box 2274, Rancho Santa Fe, Calif. 92067**

**Filed Sep. 22, 1980, Ser. No. 189,610**
**Int. Cl.³ F03G 7/02, 7/04**
**U.S. Cl. 60—641.6** **32 Claims**



1. A method of atmospheric thermal energy conversion utilizing pressurized rising conduit comprising the steps of:

(a) providing warm gas at a low elevation,

(b) transporting the warm gas upwards from the low elevation to a high elevation through a thin-walled, inflatable, rising conduit thereby providing gas within the conduit with a low density which causes the upward flow of the gas through the conduit,

(c) converting the energy of the flowing gas by passing the gas through a transducer,

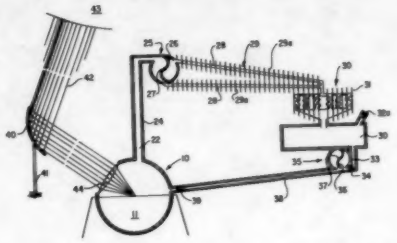
(d) pressurizing the conduit from the inside with the transported gas to thereby inflate and support the thin-walled, inflatable rising conduit.

**4,391,100**

## CLOSED LOOP HERMETICALLY SEALED SOLAR POWER GENERATOR

**Derrick A. Smith, 1180 S. Seabreeze Blvd., Fort Lauderdale, Fla. 33316**

**Filed Aug. 27, 1979, Ser. No. 70,327**
**Int. Cl.³ F03G 7/02**
**U.S. Cl. 60—641.11** **1 Claim**



1. A closed loop sealed recirculatory water conservation solar power generator comprising:

(a) a stationary hollow globular boiler, said boiler including water inlet means disposed adjacent said upper portion of said globular boiler, an upwardly directed steam outlet conduit originating from the uppermost portion of said globular boiler, and a refractor lens window disposed within an upper portion of said globular boiler, said boiler being adapted to contain a body of water;

(b) controllable means comprising a paraboloid reflector mounted on a post for directing the sun's rays towards said refractor lens window, thereby to generate heat to boil water in said globular boiler;

(c) a primary steam-powered turbine for the generation of electricity, said turbine being disposed at a level above that of said boiler, said primary steam-powered turbine being connected to said steam outlet conduit and thus being driven by steam under pressure from said globular boiler;

(d) steam condenser means comprising a radiator connected to the outlet from said primary steam-powered turbine for simultaneously recovering useful heat from said steam and for partially condensing said steam to a mixture of steam and water, and a condenser connected to the outlet from said radiator for substantially completely condensing said steam to substantially pure water;

(e) a closed reservoir connected to an outlet from said condenser, said reservoir being disposed at a level lower than the level of said primary steam-powered turbine but at a level higher than the level of said globular boiler, said reservoir being for receiving and storing said substantially pure water from said condenser;

(f) a secondary water-powered turbine for the generation of electricity, said turbine being disposed at a level lower than that of said reservoir but at a level higher than that of said globular boiler, said turbine being connected to said reservoir, said secondary, water-powered turbine and being selectively driven by water from said reservoir;

(g) a valve automatically sequenced for periodic opening, to permit flow of water from said reservoir to said secondary turbine to drive said turbine, for for periodic closing to cut-off said flow of water to permit said secondary turbine to remain at rest;

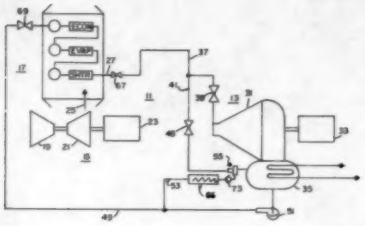
(h) effluent means from said secondary turbine to conduct pure water to an inlet to said globular boiler, said inlet being disposed at an upper portion of said globular boiler; and

(i) a check valve in said effluent means (h) to control the recirculating flow of water back to said globular boiler.

## 4,391,101
## ATTEMPERATOR-DEAERATOR CONDENSER

Donald E. Labbe, Woburn, and Mayo E. Brown, Jr., Milton, both of Mass., assignors to General Electric Company, Lynn, Mass.

Filed Apr. 1, 1981, Ser. No. 250,967
Int. Cl.³ F01K 21/06
U.S. Cl. 60—646 6 Claims



1. In an improved power plant of the type having a steam generator providing steam to a steam turbine, said steam turbine exhausting into a condenser for condensing exhaust steam into feedwater for the steam generator; means for pumping feedwater from the condenser to the steam generator, said steam generator connected to said steam turbine and condenser through a main steam header and a bypass line respectively; and, wherein the improvement comprises:

a recirculation loop for recirculating a portion of said feedwater into the condenser;

means for heating said feedwater upstream from said condenser whereby said feedwater is slightly above saturation temperature; and,

nozzle means for delivering said heated feedwater into said condenser whereby flashing is effected for deaeration purposes.

## 4,391,102
## FRESH WATER PRODUCTION FROM POWER PLANT WASTE HEAT

Walter R. Studhalter, Woodland Hills; William E. Amend, Rolling Hills Estates, and Norman L. Helgeson, Pasadena, all of Calif., assignors to Biphase Energy Systems, Santa Monica, Calif.

Filed Aug. 10, 1981, Ser. No. 291,339
Int. Cl.³ F01K 25/04; F03G 7/00
U.S. Cl. 60—649 18 Claims

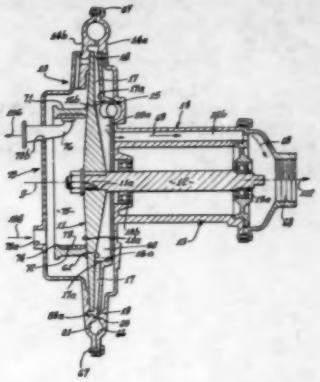
1. In reaction turbine and pump apparatus, the combination comprising

(a) first nozzle means to receive heated fluid for expansion therein to form a two-phase discharge of gas and liquid,

(b) a separator rotor having an axis and a rotating surface located in the path of said discharge for supporting a layer of separated liquid on said surface,

(c) the rotor having reaction nozzle means to communicate with said layer to receive liquid therefrom for discharge in a direction or directions developing torque acting to rotate the rotor,

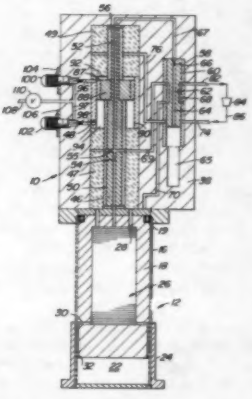
(d) and a pump associated with and driven by said rotor, the pump including an annular rim surface to receive impingement of liquid to be pumped, the liquid collecting as a rotating ring on said rim surface.



## 4,391,103
## FLUIDIC CRYOGENIC REFRIGERATOR

Domenico S. Sarcia, Carlisle, Mass., assignor to CVI Incorporated, Columbus, Ohio

Filed Apr. 19, 1982, Ser. No. 369,865
Int. Cl.³ F25B 9/00
U.S. Cl. 62—6 10 Claims



1. In a cryogenic refrigerator in which a movable displacer means defined within an enclosure first and second chambers of variable volume, and in which a refrigerant fluid is circulated in a fluid flow path between said first chamber and said second chamber by the movement of said displacer means controlled in part through the introduction of high-pressure fluid and the discharge of low-pressure fluid, chamber means for guiding a slide connected to the displacer means, said slide having an axial passage communicating with one end of said chamber means remote from the displacer means, a piston coupled to said slide for controlling movement of the displacer means, valve means for metering flow between opposite sides of said piston, the cross-section of said slide being smaller on one side of the piston than on the other side, said passage in said slide having a restriction, a valve having a spool valve member for controlling flow the high and low pressure fluid, means

including a conduit communicating one end of said spool valve member with said one end of said chamber means for introducing high fluid pressure into the conduit to shift the spool valve member when the displacer means is at one of the extremities of its movement.

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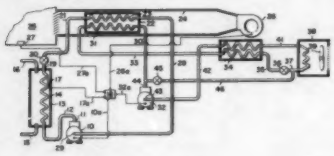
**4,391,104**

## CASCADE HEAT PUMP FOR HEATING WATER AND FOR COOLING OR HEATING A COMFORT ZONE

**James C. Wendschlag, Onalaska, Wis., assignor to The Trane Company, La Crosse, Wis.**

**Filed Jan. 15, 1982, Ser. No. 339,540**
**Int. Cl.³ F25B *27/02, 7/00***
**U.S. Cl. 62—79** **15 Claims**



1. A heat pump system selectively operable in cascade fashion for heating water and in non-cascade fashion, for heating or cooling air, comprising

a. a first compressor selectively operative to compress a first refrigerant fluid, and including a first suction port and a first discharge port;

b. a refrigerant-to-water heat exchanger connected in fluid communication with the first discharge port and operative to transfer heat from the first refrigerant fluid compressed in the first compressor, to water, thereby condensing the first refrigerant fluid and heating the water;

c. first expansion means, in fluid communication with the refrigerant-to-water heat exchanger, for expanding and reducing the pressure of the condensed first refrigerant fluid;

d. a tri-fluid heat exchanger including non-communicating first and second circuits and air passages arranged to provide heat transfer between the first refrigerant fluid, a second refrigerant fluid, and air, respectively; an inlet to said first circuit being connected in fluid communication to the first expansion means, and an outlet from said first circuit being connected in fluid communication with the first suction port for return of the first refrigerant fluid vaporized in said tri-fluid heat exchanger to the first compressor;

e. a second compressor selectively operative to compress the second refrigerant fluid, including a second suction port, and a second discharge port connected in fluid communication with an inlet to said second circuit in the tri-fluid heat exchanger;

f. second expansion means connected to an outlet from said second circuit, for expanding and reducing the pressure of the second refrigerant fluid condensed in the tri-fluid heat exchanger; and

g. an evaporator heat exchanger, connected in fluid communication between said second expansion means, and said second suction port, operative to provide heat transfer with a source of heat to vaporize the second refrigerant fluid prior to its return to the second compressor, said system being used in a first mode to heat the water and cool the air when only the first compressor is selectively energized, or in a second mode to heat the water when both the first and second compressors are selectively energized, in cascade relationship, or, in a third mode, to heat the air when only the second compressor is energized.

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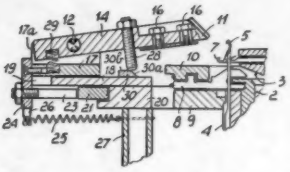
**4,391,105**

## YARN FEED UNIT IN A SINGLE-CYLINDER CIRCULAR KNITTING MACHINE

**Francesco Lonati, Brescia, Italy, assignor to Costruzioni Meccaniche Lonati S.p.A., Brescia, Italy**

**Filed Mar. 16, 1981, Ser. No. 244,472**
**Claims priority, application Italy, Apr. 1, 1980, 21362/80[U]**
**Int. Cl.³ D04B *15/58***
**U.S. Cl. 66—138** **5 Claims**



1. An improved yarn feed unit in a single-cylinder circular knitting machine, in particular a hose or the like knitting machine, comprising a plurality of yarn feeding fingers arranged side-by-side and independently journalled about a common axis, said yarn feeding fingers being movable independently of one another between inoperative and operative positions, an arm journalled to said common axis and having a small plate secured thereto and extending underneath all of said yarn feeding fingers, means for raising said arm and along therewith, through the intermediary of said small plate, all of said yarn feeding fingers at once to a rest position substantially coincident with said inoperative position, a carrier body supporting said axis, means for substantially radially displacing said carrier body between a position close to said needle cylinder and a position remote from said needle cylinder, said means for raising said arm being operative upon said carrier body being displaced to said position remote from said needle cylinder.

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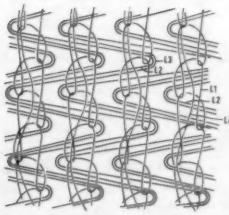
**4,391,106**

## WOUND DRESSING

**Ewald Schäfer, Wolfstein, and Harald Jung, Kreimbach, both of Fed. Rep. of Germany, assignors to Karl Otto Braun K.G., Wolfstein, Fed. Rep. of Germany**

**Continuation of Ser. No. 880,150, Feb. 22, 1978, abandoned.**
**This application Apr. 21, 1980, Ser. No. 141,812**
**Int. Cl.³ D04B *23/08***
**U.S. Cl. 66—193** **9 Claims**



1. A warp knitted fabric for use as a surgical bandage and dressing comprising four yarns arranged in a plurality of wales and causes including a first yarn comprising a basic stitch construction (L1) and second, third, and fourth yarns bound in as in-laid threads (L2, L3, L4), said fourth yarn consisting of a thick, roughened binding yarn of high volume bound in warpwise, said second and third yarns consisting of cross filling long looped, highly twisted yarns of sinuous configuration having a twist of one of the Z-twisting direction and S-twisting direction, one of said second and third yarns being bound in be-

tween two adjacent wales and the other of said second and third yarns being bound in between three adjacent wales.

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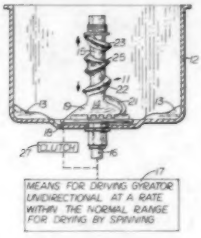
**4,391,107**

## SPIRAL GYRATOR FOR WASHING MACHINES

George M. Gibson, 322 Brookvale Rd., Kinnelon, N.J. 07405

Filed May 21, 1981, Ser. No. 265,936
Int. Cl.³ D06F 17/10
U.S. Cl. 68—133 2 Claims




1. A washing machine comprising:

a tub having a bottom and a substantially vertical wall for enclosing a space to contain wash,

a gyrator having a base and a driving post, said base subtending a substantial portion of said bottom, said base having an outer circumferential portion and an inner upper portion shaped substantially as a frustum of a cone, the base of the cone being parallel with said bottom and said outer portion extending outwardly therefrom, said driving post extending coaxially upwardly from the truncated end of said inner portion of said base,

a driving surface comprising a spiral ridge having one end positioned substantially circumferentially on the upper surface of said outer circumferential portion and extending from said one end gradually inwardly and upwardly in one circumferential direction on the surface of said inner portion of said base to said truncated end thereof and continuing in said one circumferential direction like an expanded helical screw thread upwardly about said driving post to an upper intermediate region of said post where said ridge gradually reverses in circumferential direction to form at least one helical turn of opposite direction near the upper end of said driving post, the ends of said driving surface having gradual and smooth contours, and

unidirectional driving means connected to said driving post to rotate said gyrator about said axis thereof.

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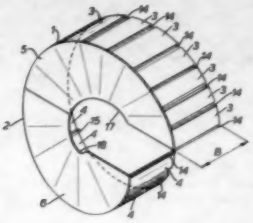
**4,391,108**

## DRUM FOR A CONTINUOUSLY OPERATING LAUNDRY PROCESSING MACHINE

Richard R. Albers, Warren, N.J., assignor to Passat-Maschinenbau GmbH, Heilbronn, Fed. Rep. of Germany

Filed Nov. 6, 1980, Ser. No. 204,659
Claims priority, application Fed. Rep. of Germany, Nov. 7, 1979, 2944857
Int. Cl.³ D06F 21/02, 37/08
U.S. Cl. 68—143 8 Claims

1. A drum for a continuously operating textile processing machine, comprising a drum shell, defining an interior space having a central longitudinal axis and a horizontal middle plane, a conveying screw composed of right helicoids which divide the interior space of the drum shell into individual chambers, the drum being constructed from individual elements joined to each other by weld seams, each element comprising an upper portion and a lower portion which are welded together in the horizontal middle plane of the drum interior space, each of said upper and lower portions consisting of a surface which follows the shape of a helix and forms a part of the drum shell, and a surface corresponding to a half helicoid of the conveying screw, said half helicoid surface being



welded to the said surface forming a part of the drum shell of the said portion.

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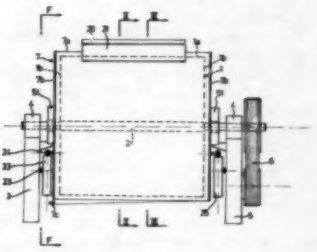
**4,391,109**

## APPLIANCE DESIGNED FOR THE TREATMENT, PARTICULARLY IN A LIQUID, OF A PRODUCT LIKE LEATHER AND PROCEDURE FOR APPLYING THIS APPLIANCE

Yves Grenier, Le Verdin, France, assignor to R.I.A.T., Charavines, France

Filed Feb. 18, 1981, Ser. No. 235,478
Claims priority, application France, Feb. 18, 1980, 80 03516
Int. Cl.³ C14C 1/00; D06F 21/00
U.S. Cl. 69—30 17 Claims



1. An appliance designed for the liquid treatment of a product like leather, comprising a tank which can be filled at least partly with the treatment liquid and which is provided with an opening made in its peripheral wall, a rotary drum placed inside the tank, said drum being mounted on a roughly horizontal shaft which runs from end to end of the said tank and which can be driven in rotation, said drum having a peripheral envelope and compartments separated by axial partitions extending roughly radially from its shaft to said peripheral envelope, the product being loaded into each of the compartments in order to be treated by rotation of the drum and discharged through the said tank opening, each compartment having an opening and a lockable door in said peripheral envelope, said appliance being characterized by the fact that said tank is mounted to swing round the drum shaft, a fixing means for temporarily fixing together in rotation the drum and the tank when the opening of one of the compartments is placed opposite the tank opening with the object of loading and discharging the product in this compartment, a drive means for swinging the tank between a first position in which its opening is placed roughly in its top position and a second position in which its opening is placed on the side, the product being treated by rotation of the drum when the opening of the said tank is in the said first position, loading of the product being

performed through the top when the opening of the tank is in the said first position and the opening of the compartment to be loaded is opposite the tank opening, and discharge of the product being carried out on the side after the tank and the drum fixed together by the fixing means have been swung round by means of the said drive means to move the tank opening from the first position to said second position .

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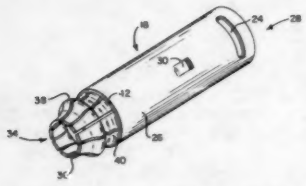
**4,391,110**

**BARREL LOCK SLEEVE**

**Anker J. Nielsen, Jr., Holden, Mass., assignor to Omco Inc., Holden, Mass.**

**Filed Jul. 29, 1981, Ser. No. 288,189**
**Int. Cl.³ E05B** *17/14, 67/36*
**U.S. Cl. 70—34** **7 Claims**




1. A barrel lock sleeve adapted to be pushed into and resiliently snap-mounted in a meter box door aperture, said sleeve adapted to be fixed in the door aperture by a barrel lock inserted and locked within said sleeve, said sleeve comprising:

(a) a hollow cylindrical sleeve having open leading and trailing ends;

(b) said sleeve having four axially sequential portions including a tip portion and a locking ball retaining portion both adapted to be inserted through the door aperture and positioned on the inside of the door, a neck portion adapted to be positioned within the door aperture, and a shoulder portion adapted to be positioned on the outside of the door;

(c) said tip portion being located at the extreme leading end of said sleeve and having an uncompressed outside diameter smaller than the door aperture diameter;

(d) said locking ball retaining portion being located to the rear of said tip portion and having at least a portion of its uncompressed outside diameter larger than the door aperture diameter, said locking ball retaining portion including means for permitting said larger outside diameter portion of said locking ball retaining portion to be resiliently and sufficiently reduced in diameter as said larger portion is pushed through the door aperture, and for permitting said larger outside diameter portion of said locking ball retaining portion to snap back to its original uncompressed outside diameter after said larger portion has passed to the inside of the meter box door;

(e) said neck portion being located to the rear of said locking ball retaining portion, and having an outside diameter smaller than the door aperture diameter;

(f) said shoulder portion being located to the rear of said neck portion and having at least a portion of its outside diameter larger than the door aperture diameter and having an inside diameter larger than the barrel lock head diameter; and

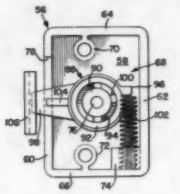
(g) said sleeve having an interior length, shape and inside diameter selected to permit the insertion of an unlocked barrel lock entirely therein, and to accommodate the radial extension of the barrel lock locking balls within said locking ball retaining portion when said barrel lock is locked, said sleeve being sized and shaped to remain fixed in the meter box door aperture when the barrel lock is locked, and to be removed from the door aperture when the barrel lock is unlocked.

**4,391,111**

**LATCHING MECHANISM FOR DISPENSER APPARATUS**

**Russell A. Marcy, Watertown, Conn., assignor to Waterbury Companies, Inc., Waterbury, Conn.**

**Filed Jun. 12, 1981, Ser. No. 273,137**
**Int. Cl.³ B65D** *55/14;* **E05B** *15/06*
**U.S. Cl. 70—162** **10 Claims**




1. Dispenser apparatus for repeated use in dispensing a consumable through an outlet opening, said dispenser apparatus including a casing having a body member both for supporting a container for said consumable and enclosing said container within a space, and a closure member mounted on said body member to close said space preventing access to said consumable; means mounting said closure member for movement between an open position to permit replenishment of said consumable and a closed position; latching means for latching said closure member in said closed position to prevent substantially unauthorized access to said space, said latching means including a stationary latching element carried by one of said body member and container, a movable latching element carried by said closure member, said movable latching element including a base, a hub extending from said base, a rim likewise extending from said base and spaced outwardly of said hub to define a recess therebetween, at least one projection within said recess at said base, an ear extending from said base, means for mounting said movable latching element to said closure member, means for biasing said movable latching element to a first position, means carried by said mounting means for supporting one end of said biasing means whose other end is supported by said ear, and a nose extending from said base to cooperatively interact with said stationary latching element for latching said closure member when said movable latching element is in said first position; said mounting means also supporting said movable latching element for movement from said first position; and a key having an operative portion to be received in said recess, said operative portion having a slot equal in number and spaced apart in accordance with the spacing of each said projection, each said projection being received in a slot to engage said key and movable latching element whereby movement of said movable latching element in opposition to said biasing means in following movement of said key results in movement of said movable latching element from said first position toward a second position for release of said cooperative interaction between latching elements.

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**4,391,112**

**PISTON-TYPE LOCKS**

**Guy Neyret, Oullins, France, assignor to Sodex-Magister, Societe d'Exploitation, Croissy, France**

**Filed Jul. 9, 1980, Ser. No. 167,283**
**Claims priority, application France, Jul. 23, 1979, 79 18918**
**Int. Cl.³ E05B** *9/04, 27/04*
**U.S. Cl. 70—364 A** **7 Claims**

1. A piston-type lock comprising:

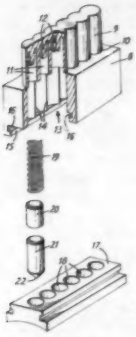
(a) a stator,

(b) a cylindrical rotor pivoting in a longitudinal bore of the stator, said rotor comprising a longitudinal key passage and a plurality of radial bores opening into the key passage and to the periphery of the rotor, said stator comprising a plurality of bores opening into the longitudinal bore of the

stator and each continuing, in one angular position of the rotor, a radial bore of the rotor,

(c) a sliding piston within each radial bore of the rotor,

(d) a sliding piston within each radial bore of the stator spring-loaded towards the longitudinal bore of the stator, the pistons of the rotor each cooperating with a piston of the stator in the said angular position, the inner extremities of the pistons of the rotor cooperating with the notches of a coded key introduced into the key passage in such manner that the other extremities of the said rotor pistons are flush with the periphery of the rotor, said stator comprising an aperture opening at its periphery and into the said longitudinal bore,



(e) an insert within said aperture having radial passages, and

(f) a pair of pistons and a return spring located within each radial passage, said insert being in two parts sliding telescopically one in relation to the other to reduce the effective length of said radial passages,

(g) said insert comprising retractable stops for the inner radial extremity of each of the said pairs of pistons, the retraction of the said stops causing the liberation of the said pairs of pistons and the introduction of the lower pistons into the radial bores of the rotor.

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**4,391,113**

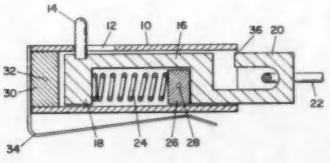
## ONE-HAND KEY RING

**Douglas M. Jorgens, 1527 Sitka Ave., Sun Valley, Calif. 93063**

**Filed Aug. 3, 1981, Ser. No. 289,507**

**Int. Cl.³ A47G *29/10***

**U.S. Cl. 70—459** **5 Claims**



**1.** A key ring device adapted to be attached at one end to a piece of clothing and to hold a ring of keys at the other comprising a tubular outer shell, a slot disposed within said outer portion, a U-shaped inner body, a spring disposed within said U-shaped inner body, a button fixedly attached to said U-shaped inner body which button passes through the slot in the outer shell, said inner body comprising a U-shaped key ring holder portion, means to attach the key ring device to a piece of clothing.

**4,391,114**

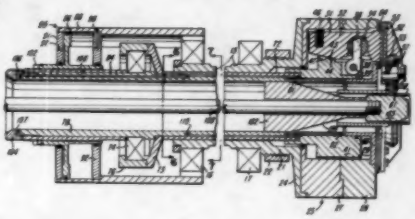
## SHEAR FORMING APPARATUS FOR ELONGATED NON-ROTATING METAL TUBES

**Anthony C. Keathley, Xenia, Ohio; Howard F. Stanton, Lockport, and Mahesh M. Wagle, Amherst, both of N.Y., assignors to Tubing Technology, Inc., Alpha, Ohio**

**Filed May 26, 1981, Ser. No. 266,708**

**Int. Cl.³ B21B *19/12***

**U.S. Cl. 72—78** **28 Claims**



**1.** Shear forming apparatus for reducing the diameter of an elongated cylindrical workpiece, comprising a tubular spindle supporting an annular forming head for rotation on an axis, a plurality of angularly disposed forming wheels supported by said head for orbital movement around the axis, an actuating tube disposed within said spindle for rotation therewith and supported for axial movement within said spindle, actuating means within said head and connected to said actuating tube, said actuating means being effective to move said forming wheels in corresponding generally radial directions in response to axial movement of said actuating tube within said spindle, means for pulling the workpiece axially through said spindle and said head and between said forming wheels, a fluid cylinder having a non-rotating piston, means including a non-rotating connecting tube and a thrust bearing for connecting said piston to said actuating tube for moving said actuating tube axially while said spindle and head are rotating to effect radial inward deformation of the workpiece by said forming wheels, and means for precisely adjusting a limit of movement of said connecting tube to control the limit of generally radial inward movement of said forming wheels.

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**4,391,115**

## METHOD AND APPARATUS FOR BENDING METAL BEAMS

**William Slattery, Annbank Station; Thomas Brechany, Ayr, and Colin J. MacLeod, Glasgow, all of Scotland, assignors to Caledonian Mining Company Limited, Nottinghamshire, England**

**Filed Dec. 3, 1980, Ser. No. 212,594**

**Claims priority, application United Kingdom, Dec. 4, 1979, 7941886**

**Int. Cl.³ B21D *7/04, 43/28***

**U.S. Cl. 72—131** **21 Claims**

**1.** A machine for forming a curved beam, said machine comprising

a former having a convex arcuate edge bounded by opposed ends,

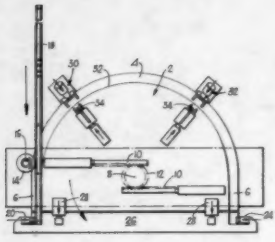
a first clamp positioned to cooperate with one of said ends of said arcuate edge, said first clamp being adapted to hold one end of a beam in fixed position relative to said arcuate edge prior to and during the bending of that beam about said arcuate edge,

a roller positioned adjacent to said arcuate edge but spaced therefrom a distance not significantly greater than the width of said beam, said roller being moveable relative to said former for bending said beam about said arcuate edge between a beam entry position at which said beam is initially clamped to said arcuate edge between said roller

and said arcuate edge, and a curved beam position at which said beam is bent about said arcuate edge,

motor means for moving said former relative to said roller for translating said beam between said entry and curved positions, and

a second clamp positioned to cooperate with the opposite



end of said arcuate edge, said second clamp being adapted to hold the other end of said beam in fixed position adjacent said opposite end of said arcuate edge after said beam has been bent about said arcuate edge, said second clamp being operatively connectable with the other end of said beam only after said beam has been bent about said arcuate edge.

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**4,391,116**

## LACE BENDING APPARATUS

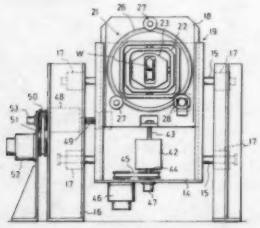
**Teruaki Yogo, Kabushikikaisha Chuodenkiseisakusho 4423 aza-Johnoh, Ohaza-Ohmori, Moriyama-ku, Nagoya-shi, Japan**

**Filed Dec. 2, 1980, Ser. No. 212,184**

**Claims priority, application Japan, Dec. 3, 1979, 54-157225; Sep. 1, 1980, 55-120944**

**Int. Cl.³ B21B** *15/00, 39/00*

**U.S. Cl. 72—168** **5 Claims**



1. A lace bending apparatus comprising:

a. a material feed device for supplying a material in the lengthwise direction thereof,

b. a first guide roller element provided fixedly on the side to receive said material supplied from said material feed device and adapted to locate said material,

c. a support mechanism including a plurality of frames provided fixedly on the side to receive said material supplied from said first guide roller element and a movable element mounted to move in directions perpendicular to the direction of supply of said material from said first guide roller element,

d. a second guide roller element provided in said movable element and adapted to bend said material,

e. means to maintain said second guide roller element substantially at right angles to the direction of feed of said material,

f. a plurality of driving means connected to said movable element for moving said movable element in said perpendicular directions,

g. a means connected to said material feed device for detecting the amount of feed of said material by said material feed device, and

h. a control device responsive to information from said feed-amount detecting means for controlling said driving means, including an input portion adapted to receive the feed amount information from said detecting means, a memory portion for storing in advance the relationship between the feed amount of said material and the moving amount of said movable element, and a command portion adapted to designate driving amounts of said driving means based on said relationship stored in said memory portion, in accordance with said information from said input portion, wherein said movable element includes a first slide provided movable in the horizontal direction perpendicular to the direction of supply of said material from said first guide roller element and a second slide provided movable in a vertical direction, said driving means includes a first-slide driving element connected to said first slide for moving said first slide in said horizontal direction and a second-slide driving element connected to said second slide for moving said second slide in a vertical direction, and said memory portion of said control device includes a first memory means storing in advance the relationship between the amount of feed of said material and the moving amount of said first slide and a second memory means storing in advance the relationship between the amount of feed of said material and the moving amount of said second slide and wherein said command portion of said control device includes a first command means responsive to information from said input portion for designating a moving amount to said first-slide driving element based on the relationship stored in advance into said first memory means and a second command means responsive to information from said input portion for designating a moving amount to said second-slide driving element based on the relationship stored in advance into said second memory means.

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**4,391,117**

## ROLLING MILLS AND METHODS OF ROLLING

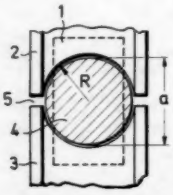
**Werner Demny, Düsseldorf, Fed. Rep. of Germany, assignor to Friedrich Kocks GmbH & Company, Ilden, Fed. Rep. of Germany**

**Continuation of Ser. No. 42,812, May 29, 1979, abandoned. This application Sep. 8, 1981, Ser. No. 300,325**

**Claims priority, application Fed. Rep. of Germany, Jun. 2, 1978, 2824143**

**Int. Cl.³ B21B** *13/22, 1/46*

**U.S. Cl. 72—224** **13 Claims**




1. A rolling mill for rolling of bars and wire from stock having a rectangular, oval or similar elongate cross-sectional shape, the ratio of the lengths of the principal axes of the cross section of said stock being larger than approximately 1:2, comprising a plurality of roll stands arranged closely one behind the other to define a line of sizing passes, said roll stands having (a) a first entry sizing pass stand formed by two rolls whose roll axis is substantially transverse to the principal axis of the stock

being rolled and receiving the stock to be rolled, (b) the cross-sectional shape of the said first sizing pass being one of an exact circle, a regular polygon having an even number of sides and a like but somewhat elongated geometrical figure, (c) the ratio of the lengths of whose principal axes does not exceed approximately 1:2, and (d) at least one three roll stand immediately following said two roll stand receiving the rolled stock from said first stand, the first stand of said three roll stands adjacent the two roll stand having one roll axis extending parallel to the longer principal axis of the first sizing pass cross section, in the case wherein the latter is somewhat elongated, all roll stands following the first stand being three roll stands.

9. A method of rolling bars and wire from stock having a rectangular, oval or similar elongate cross-sectional shape, the ratio of the lengths of the principal axes of the cross section of said stock being larger than about 1:2, comprising the steps of:

(a) passing said stock between two rolls forming a first roll pass opening having a cross-sectional shape in one of an exact circle, a regular polygon having an even number of sides and a like elongate geometric figure having principal cross-sectional axes whose ratio is less than 1:2, and whose roll axes are substantially transverse to the principal axis of the stock being rolled; and

(b) thereafter passing the sized product successively through at least one additional roll pass formed by three rolls, said roll pass immediately following the two roll pass having one roll axis extending parallel to the longer principal axis of said first roll pass section in the case where said section is elongate, and all passes thereafter being three roll passes.

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**4,391,118**

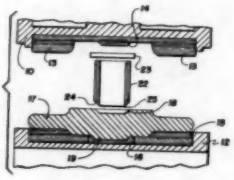
## MECHANISM FOR FORMING A HOLE THROUGH A FORGED WORKPIECE

**Wayne A. Martin, Pittsburgh, Pa., assignor to United States Steel Corporation, Pittsburgh, Pa.**

**Division of Ser. No. 45,529, Jun. 4, 1979, Pat. No. 4,299,110, which is a continuation-in-part of Ser. No. 892,715, Apr. 3, 1978, abandoned. This application May 6, 1981, Ser. No. 261,071**

**Int. Cl.³ B21D *28/00***

**U.S. Cl. 72—356** **4 Claims**



1. In a forging press which includes cooperating sets of top and bottom dies for shaping a workpiece heated to a hot forging temperature, the combination therewith of an improved mechanism for forming a hole through the workpiece, said mechanism comprising:

a male die member in said set of top dies engageable with the upper surface of the workpiece for forming an indentation therein; and

a tubular trepanning tool having at least one sloping face extending around its circumference at its lower end;

said male die member having tapered circumferential edges matching the sloping face of said tool and being of a diameter substantially equal to the tool diameter, whereby the indentation formed in the workpiece receives the sloping face of said tool and serves to center it;

said set of top dies being adapted to apply force to said tool to hot-trepan a hole in the workpiece at the indentation before the workpiece is removed from the press following the forging operation.

**4,391,119**

## APPARATUS FOR CUTTING SWIVEL-BENDING AND PRESS-BENDING SHEET METAL AND SIMILAR MATERIALS

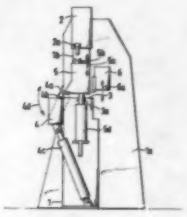
**Peter Schmitz, Pietra Rossa-Renon, Prov. Bozen, Italy**

**Filed Feb. 13, 1981, Ser. No. 234,615**

**Claims priority, application Italy, Feb. 20, 1980, 4810 A/80**

**Int. Cl.³ B21D *5/01***

**U.S. Cl. 72—384** **6 Claims**



1. Apparatus for cutting, swivel-bending and press-bending of sheet material, comprising: a frame for receiving said sheet material; a cross-beam having a first press-bending element; an integral clamping beam having a second press-bending element; means providing a bearing surface, said frame supporting said cross-beam and said clamping beam for movement relative to one another to effect engagement of said first and second press-bending elements with said sheet materials for press-bending thereof, said frame further supporting said clamping beam and such bearing surface means for movement relative to one another to clamp said sheet material for cutting and swivel-bending thereof, and a shearing beam supported by said frame for movement independently of movement of said clamping beam.

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**4,391,120**

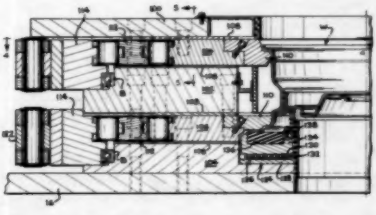
## RADIAL DEFORMATION MEANS FOR CYLINDRICAL OBJECTS SUCH AS WHEELS

**David Trevarrow, 119 Reiniche, Horton, Mich. 49246**

**Filed Mar. 12, 1979, Ser. No. 19,683**

**Int. Cl.³ B21D *53/26***

**U.S. Cl. 72—403** **20 Claims**

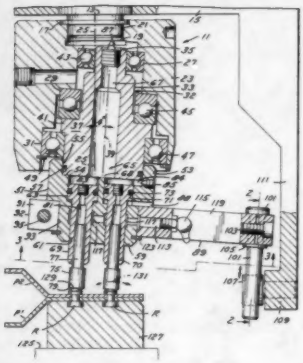


1. Truing apparatus for wheels having a rim with opposing bead seats and a web, said apparatus comprising: radially inwardly moving concentric dies movable in a predetermined plane, a rigid support surface parallel to said predetermined plane, a plurality of rollers having the same diameter on said rigid support surface, an annular surface plate on said rollers free to move parallel to said rigid support surface, and a resilient surface on said annular surface plate, said resilient surface being arranged to support the rim of a wheel being worked open by said radially inwardly moving dies and being adapted to accommodate lateral deflection produced by said dies.

## 4,391,121
## ORBITAL TOOL ASSEMBLY FOR FORMING RIVET HEADS

V. Taruntaev, Davison, Mich., assignor to T. A. Systems, Inc., Troy, Mich.

Filed May 13, 1981, Ser. No. 263,380
Int. Cl.³ B21J 7/20
U.S. Cl. 72—406 27 Claims



1. An orbital tool assembly for forming rivet heads comprising a housing adapted for an attachment to a driven member rotatable upon a first axis;

said housing having a bore extending along a second axis inclined at an acute angle to said first axis;

an elongated equalizing head having a longitudinal axis coincident with said second axis nested and retained within said housing;

bearing means interposed between said head and housing for journalling said housing for rotation about said first axis relative to said head;

said head having an axial bore defining a fluid pressure chamber open at one end;

a cylindrical driver coaxial with and mounted upon said head projecting from said housing and having a plurality of longitudinal bores parallel to said second axis and communicating with said pressure chamber;

a longitudinally reciprocal peening tool holder having an elongated bore movably mounted in each of said driver bores;

each holder having a piston movable in said driver head bore and normally biased outward by pressurized fluid filling said head and driver bores on one side of said piston;

an elongated peening tool mounted within each peening tool holder, at its outer end having a transverse rivet working surface, adapted for registry and operative engagement with an unheaded rivet projecting through a pair of parts upon a support to be secured together;

an elongated anti-rotation arm extending at right angles to said driver and at one end mounted upon and secured thereto;

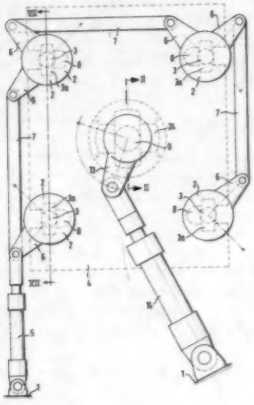
and a bracket means upon a support retainingly engaging said arm at its opposite end against rotation, said arm being free for rocking movements in a plane passing through said axes;

continuous rotation of said housing oscillating said head and peening tools in said plane over the ends of said rivets forming heads thereon.

## 4,391,122
## COMBINED HYDRAULIC CLAMPING AND ROTATING SADDLE DEVICE ON FORGING PRESSES

Fritz Priebe, Duisburg, Fed. Rep. of Germany, assignor to SMS Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Jun. 29, 1981, Ser. No. 278,681
Claims priority, application Fed. Rep. of Germany, Jul. 11, 1980, 3026295
Int. Cl.³ B21J 13/02
U.S. Cl. 72—481 4 Claims



1. In a forging press having a movable crosshead and an upper press saddle carried by said crosshead; the improvement comprising the combination of:

(a) a plurality of vertical hammer-headed saddle-retaining rods mounted for rotation and longitudinal movement on the movable crosshead, for releasably clamping said upper saddle to said movable crosshead;

(b) a centrally disposed vertical hammer-headed saddle-rotating rod mounted for rotation on the movable crosshead with the hammer head of said rod at the lower end thereof projecting downwardly from said crosshead;

(c) a receptacle provided on said upper saddle for receiving said hammer head of said saddle-rotating rod, which receptacle has a slot-like through aperture for vertical passage therethrough of said hammer head and a downwardly open slot-like seat transverse to said through aperture for receiving said hammer head and effecting rotational driving engagement of said hammer head with said upper saddle, a recess of a size corresponding to the length and height of the hammer head being provided directly below said seat and aperture whereby said hammer head is transferrable from said aperture to said seat and vice versa by rotation within said recess;

(d) means for effecting rotation of said saddle-rotating rod and for effecting relative movement of said rod and said upper saddle in the longitudinal direction of said rod; and

(e) means for effecting said rotation and longitudinal movement of said saddle-retaining rods.

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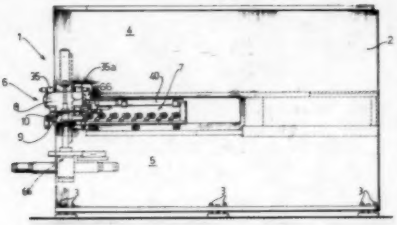
## 4,391,123
## AUTOMATIC PUNCHING MACHINE

Guido Salvagnini, Arzignano, Italy, assignor to Salvagnini Transferica S.p.A., Italy

Filed Aug. 15, 1980, Ser. No. 178,565
Claims priority, application Italy, Sep. 12, 1979, 25676 A/79
Int. Cl.³ B26F 1/04
U.S. Cl. 72—464 6 Claims

1. An automatic punching machine for performing punching

of a metal sheet in a programmed and programmable manner, comprising, in combination, a punching head provided with a plurality of independently operable punch and die pairs arranged at respective operative positions of the punching head, a numerically controlled programmable manipulator equipped with gripping means for gripping the metal sheet and with first and second driving means for displacing said gripping means in first and second horizontal directions perpendicular to one another, and a rotator for rotating the metal sheet through desired angles about a vertical axis, said manipulator including a first horizontal arm movable in the first direction and a second horizontal arm mounted on said first arm and movable in



said second horizontal direction, said second arm being equipped with the said means for gripping the metal sheet, and motor means for rectilinear alternating displacements of the said arms independently from one another, a disappearing plane is provided for receiving and supporting the metal sheet to be punched, said plane being defined by a plurality of rods extending parallel to said second arm of the manipulator and eccentrically mounted on pivot pins so as to be normally held in raised position, said manipulator further including a rectilinear shaft fixed to and extending parallel to said first arm in such a position as to engage progressively said rods and to displace the same to a lowered position during the advancing movement of said first arm of the manipulator.

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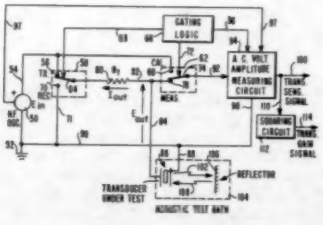
**4,391,124**

## ELECTROACOUSTIC TRANSDUCER CALIBRATION METHOD AND APPARATUS

**Cornelis J. Drost, and G. Jan Milanowski, both of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.**

**Filed Feb. 26, 1981, Ser. No. 238,319**
**Int. Cl.³ H04B *11/00*; H04R *29/00***
**U.S. Cl. 73—1 DV** **33 Claims**




**1.** A self-reciprocity calibration method for terminated ultrasonic transducers, comprising:

supplying a driving signal from a driving source to a transducer in a transmit mode to cause said transducer to emit a burst of ultrasonic waves;

switching said transducer to a receive mode to receive an echo of its emitted wave, said transducer responding to said echo wave to produce a transducer output signal;

measuring the ideal source value of said driving signal source;

measuring said transducer output signal, said driving signal and said output signal being fed through substantially identical impedance values; and

deriving from the measures of said driving signal and said output signal a measure of transducer performance in absolute terms under conditions of actual termination.

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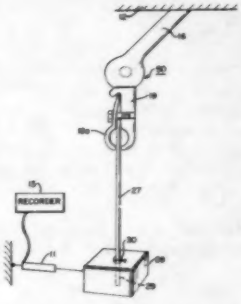
**4,391,125**

## METHOD AND APPARATUS FOR TESTING AND/OR ADJUSTING VIBRATION ABSORBER FOR SUSPENDED CABLES

**Olaf Nigol, Etobicoke, and Herbert J. Houston, Oakville, both of Canada, assignors to Slater Steel Industries Limited, Hamilton, Canada**

**Filed Jun. 10, 1981, Ser. No. 272,163**
**Int. Cl.³ G01M *19/00***
**U.S. Cl. 73—11** **12 Claims**




**1.** A method for testing and/or adjusting a vibration absorber to be used to absorb vibration from a suspended cable, comprising the steps of:

determining the desired damping of said absorber, the desired oscillation frequency at which the test is to be conducted, and the tension and mass per unit length of the cable from which vibration is to be absorbed;

selecting a logarithmic decrement value to be utilized for test purposes;

providing a pendulum to be used as a mechanical analog of the suspended cable-vibration absorber system;

adjusting the weight and radius of gyration of said pendulum to cause said pendulum to oscillate at said frequency and with said logarithmic decrement when said damping factor has said desired value;

coupling said vibration absorber to said pendulum to damp the oscillation thereof;

setting said adjusted pendulum into oscillation; and

displaying information responsive to the sensed amplitude and indicative of the logarithmic decrement of said oscillation.

**6.** Apparatus for testing and/or adjusting a vibration absorber to be used to absorb vibration from a suspended cable, comprising:

a pendulum;

means for adjusting the weight and radius of gyration of said pendulum;

means for coupling said vibration absorber to said pendulum so as to damp any oscillation of said pendulum;

means for sensing the amplitude of oscillation of said pendulum; and

display means coupled to said sensing means for displaying information indicative of the logarithmic decrement of said oscillation.

**4,391,126**

## METHOD AND APPARATUS FOR DETECTING ENGINE KNOCK IN AN INTERNAL COMBUSTION ENGINE

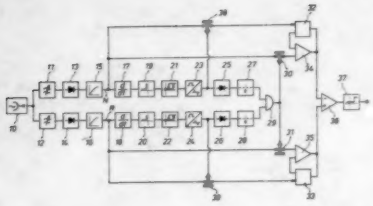
**Anton van Zanten, Ditzingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed May 28, 1981, Ser. No. 267,892**

**Claims priority, application Fed. Rep. of Germany, Jun. 2, 1980, 3020853**

**Int. Cl.³ G01L *23/22***

**U.S. Cl. 73—35** **8 Claims**



1. Method for detection of knocking in an internal combustion engine comprising the steps of:

detecting the wave shape of mechanical vibrations by a sensor responsive to engine vibrations both in a first frequency range within which engine knock vibrations commonly occur and in a second frequency range in which few, if any, components of engine vibrations commonly occur;

separating the outputs of said sensor in said first and second frequency ranges to produce a main signal and a reference signal;

initiating a comparison of said signals when both rise to a peak at approximately the same time;

performing said comparison during an interval beginning substantially when the peaks of said signals have passed, in such a way as to provide an engine knock signal when said main signal falls off more slowly than said reference signal and thereby produces a comparison output exceeding a predetermined output value.

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**4,391,127**

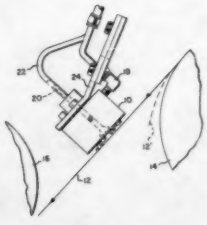
## PROXIMITY SENSOR

**William E. Hawkins, Circleville, Ohio, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Mar. 20, 1981, Ser. No. 252,519**

**Int. Cl.³ G01B *13/00***

**U.S. Cl. 73—37.7** **3 Claims**



1. A proximity sensor comprising:

a body having a plenum therein in communication with inlet and outlet passages;

an elongated tube extending through the plenum and projecting from the outlet passage, said tube having a lesser diameter than the outlet passage, presenting an annular discharge orifice, and a flared end located externally of said body and the discharge orifice; and

a pressure switch having a sensing chamber in communication with the tube.

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**4,391,128**

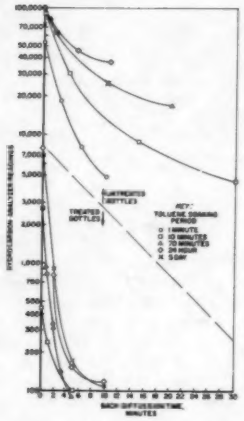
## BACK-DIFFUSION QUALITY CONTROL METHOD FOR BARRIER TREATED CONTAINERS

**Thomas E. McWhorter, Whitehall, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed Apr. 20, 1981, Ser. No. 255,958**

**Int. Cl.³ G01N *15/08***

**U.S. Cl. 73—38** **10 Claims**



1. A method for distinguishing between a solid material having at least one surface treated to impart a measurable degree of impermeability to a volatile fluid and an untreated material which comprises the steps of:

(a) exposing the treated surface to a high concentration of said volatile fluid for a fixed period of time,

(b) removing the excess fluid from said treated surface after said fixed period of time,

(c) exposing said treated surface from step (b) to an environment for causing volatile fluid to back-diffuse through said treated surface into the environment; and

(d) measuring if the concentration of said volatile fluid back-diffusing into the environment from said treated surface after a fixed period of time is at least one order of magnitude less than the concentration of such a fluid back-diffusing from said untreated material.

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**4,391,129**

## SYSTEM FOR MONITORING PHYSICAL CHARACTERISTICS OF FLUIDS

**Eugene Trinh, Los Angeles, and Taylor G. Wang, Glendale, both of Calif., assignors to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Mar. 23, 1981, Ser. No. 246,774**

**Int. Cl.³ G01N *13/02***

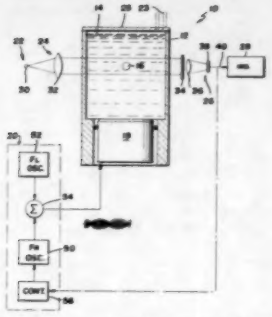
**U.S. Cl. 73—64.4** **14 Claims**

1. Apparatus useful in oscillating a drop of a first fluid when surrounded by a bath fluid, comprising:

a container for holding a bath fluid and for receiving a drop of the first fluid within the bath fluid;

transducer means coupled to said container and energizable for generating acoustic energy and conducting it into bath fluid lying in said container;

means for energizing said transducer means; and
means for sensing oscillations of the drop of first fluid;



said energizing means being frequency controllable to alter the frequency to a value which produces resonant oscillations of said drop of first fluid.

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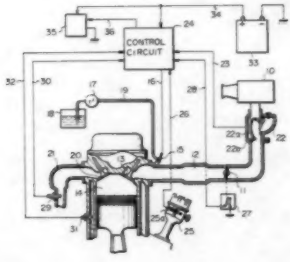
**4,391,130**

## METHOD OF AND APPARATUS FOR COMMUNICATING THE OPERATING CONDITION OF AN INTERNAL COMBUSTION ENGINE

**Jiro Nakano, Okazaki, and Hironobu Ono, Toyota, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Sep. 18, 1981, Ser. No. 303,493**
**Claims priority, application Japan, Sep. 25, 1980, 55/132269**
**Int. Cl.³ G01M *15/00***
**U.S. Cl. 73—117.3** **14 Claims**




1. A method of communicating the operating conditions of an internal combustion engine havng a throttle valve, an information output terminal, an exhaust gas sensor for detecting the concentration of a predetermined component in the exhaust gas and producing an output signal which alternates in response to the change of the detected concentration, and a feedback control system for producing, depending upon the output signal from the exhaust gas sensor, a loop feedback signal and for correcting the air-fuel ratio of the air-fuel mixture supplied to the engine depending upon the produced loop feedback signal, said method comprising the steps of:
detecting whether the throttle valve is in the idling position and producing an idling detection signal which indicates whether the throttle valve is in the idling position;
in response to the idling detection signal, discriminating whether the loop feedback signal is within a predetermined range and supplying an electrical signal which indicates whether the loop feedback signal is within the predetermined range, to said information output terminal, only when the throttle valve is in the idling position; and
in response to the idling detection signal, supplying an electrical signal which is synchronized with the output signal from the exhaust gas sensor to said information output terminal, when the throttle valve is not in the idling position.

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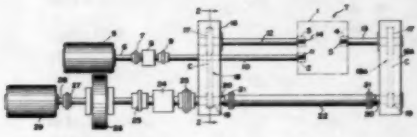
**4,391,131**

## TRANSMISSION TESTING APPARATUS AND METHOD

**George Scourtes, Plymouth, Mich., assignor to The Allen Group Inc., Saginaw, Mich.**

**Filed Nov. 10, 1980, Ser. No. 205,609**
**Int. Cl.³ G01M *13/02***
**U.S. Cl. 73—118** **12 Claims**



1. A method of testing a front wheel drive vehicle transmission having a rotary input and two rotary outputs, said method comprising coupling drive means to said input; coupling driven means to each of said outputs; coupling each of said driven means to a single rotary member so that neither output can rotate relatively to the other; and driving said drive means.

8. Apparatus for testing an automotive transmission having a pair of drive outputs each of which may be driven in a selected one of two different directions from a single drive input, said apparatus comprising an input drive shaft for connection to the transmission drive input; a pair of output shafts for connection to the respective drive outputs of the transmission; a single driven shaft; non-slip, positive drive transmitting means coupling said driven shaft to each of said output shafts and precluding any rotation of either one of said output shafts without corresponding rotation of the other in the same direction and at the same speed of rotation as said one of said output shafts; and means coupled to said driven shaft for imposing a load on the latter.

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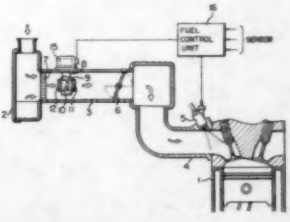
**4,391,132**

## GAS FLOW MEASURING APPARATUS

**Tsuneyuki Egami, Aichi; Hisasi Kawai, Toyohashi; Tokio Kohama, Nishio, and Hideki Obayashi, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan**

**Filed Sep. 11, 1981, Ser. No. 301,448**
**Claims priority, application Japan, Sep. 17, 1980, 55-130003**
**Int. Cl.³ G01F *1/68*; G01M *15/00***
**U.S. Cl. 73—118** **5 Claims**




1. A gas flow measuring apparatus comprising:
an electric heater disposed in a tube in which an object gas flows;
a first temperature dependent resistor disposed downstream of said electric heater in said tube;
a second temperature dependent resistor disposed at a point

free from the heat effect of said electric heater in said tube, and

a measuring circuit for measuring the flow rate of said object gas by use of output signals of said electric heater and said first and second temperature dependent resistors,

said measuring circuit includes a reference resistor circuit making up a bridge together with said first and second temperature dependent resistors,

an oscillator circuit for producing a pulse signal,

a voltage generator circuit for generating a predetermined reference voltage,

a chopper circuit driven by said pulse signal of said oscillator circuit for amplitude-modulating and converting a potential difference between one pair of diagonal points of said bridge into an AC signal,

a sample-hold circuit for sampling an amplified output voltage of said chopper circuit only for a partial period synchronous with the pulse signal of said oscillator circuit and holding said sampling votage,

a DC differential amplifier circuit for amplifying a difference voltage between a voltage based on the reference voltage produced from said voltage generator circuit and the output voltage of said sample hold circuit, and

a power amplifier circuit for power amplifying the output voltage of said DC differential amplifier circuit and applying the resulting voltage to said electric heater and said bridge, said potential difference between the pair of diagonal points of said bridge being controlled at a constant level thereby to measure the flow rate of the object gas from the value of the current flowing in said electric heater.

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**4,391,133**

## METHOD AND APPARATUS FOR MEASURING AN INJECTION AMOUNT FROM AN INJECTION DEVICE FOR USE WITH AN ENGINE

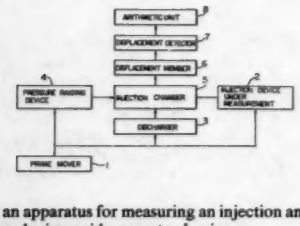
**Shinzo Ito, Aichi, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan**

**Filed May 27, 1981, Ser. No. 267,607**

**Claims priority, application Japan, Mar. 30, 1979, 54-38658**

**Int. Cl.³ G01M *15/00***

**U.S. Cl. 73—119 A** **4 Claims**




1. In an apparatus for measuring an injection amount from an injection device, said apparatus having,

a body formed with a bore,

a displacement member slidably disposed in said bore for defining an injection chamber into which a liquid is injected from said injection device, and

a prime mover for driving said injection device,

a measuring method for the injection amount comprising the steps of:

(a) raising pressure of the liquid in said injection chamber to a predetermined value;

(b) detecting a first position of said displacement member;

(c) injecting a liquid into said injection chamber from said injection device under measurement so that said displacement member is displaced in accordance with the increased amount of the liquid within said injection chamber;

(d) detecting a second position of said displacement member after said member is displaced; and

(e) calculating the amount of the liquid injected from said injection device on the basis of the relative displacement of said displacement member between said first and second positions,

wherein said raising step is carried out before each injection of the liquid from said injection device, and said predetermined value is equal to or slightly higher than a pressure at which said displacement member starts displacing before said injection step.

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**4,391,134**

## MEASURING APPARATUS FOR RAIL HEAD RUNNING SURFACE IRREGULARITIES

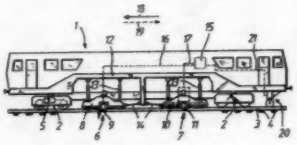
**Josef Theurer, Vienna; Johann Hansmann, Klosterneuburg, and Klaus Riessberger, Vienna, all of Austria, assignors to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H., Vienna, Austria**

**Filed Mar. 9, 1981, Ser. No. 241,832**

**Claims priority, application Austria, Feb. 27, 1980, 1093/80**

**Int. Cl.³ B61K *9/00***

**U.S. Cl. 73—146** **13 Claims**



1. A mobile apparatus mounted on a railroad track for movement in an operating direction, the track including two rails each having a rail head defining a gage side, a field side and a running surface, the apparatus being arranged for measuring and indicating such running surface irregularities as undulations and ripples, which comprises

(a) a frame,

(b) a measuring carriage linked to the frame,

(c) drive means for vertically adjusting the measuring carriage in relation to the frame and for pressing the carriage against the running surface of the rail head of a respective rail,

(d) guide roller means for vertically and laterally guiding the measuring carriage along said rail head, the guide roller means including

(1) a pair of guide rollers laterally guiding the measuring carriage along a portion of the gage side of said rail head which is not worn and the guide rollers being spaced from each other in the operating direction, and

(2) a plurality of additional guide rollers selectively engageable with the running surface of said rail head for vertically guiding the measuring carriage along the running surface of said rail head upon engagement therewith, the additional guide rollers each having an axis extending substantially parallel and transversely to the railroad track, the additional guide rollers including a pair of inner guide rollers, a pair of outer guide rollers and a pair of intermediately arranged guide rollers spaced from each other in the operating direction, the pair of outer guide rollers defining a rigid measuring reference in the wave length range of longer undulations and being spaced from each other a distance of about two meters, and a respective one of the pairs of the inner or intermediate guide rollers selectively engaged with the running surface defining a rigid measuring reference in the shorter wave length range of ripples and being spaced from each other a selected distance corresponding to at least about one sixth to one eighth of the distance between the outer guide rollers, and

(e) a rail head running surface sensing element vertically

adjustably mounted on the measuring carriage substantially centered between the pairs of guide rollers.

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**4,391,135**

## AUTOMATIC LIQUID LEVEL MONITOR

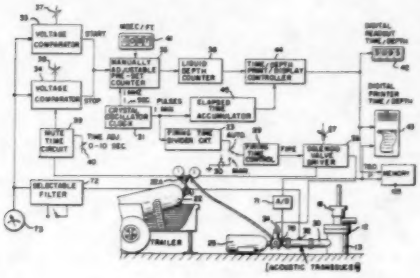
**John K. Godbey, Dallas, and Billy G. Ballard, Garland, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation of Ser. No. 140,410, Apr. 14, 1980, Pat. No. 4,318,298, which is a continuation of Ser. No. 822,507, Aug. 8, 1977, abandoned, which is a continuation-in-part of Ser. No. 749,940, Dec. 13, 1976, abandoned, which is a continuation of Ser. No. 563,249, Mar. 28, 1975, abandoned. This application Mar. 8, 1982, Ser. No. 355,641**

**The portion of the term of this patent subsequent to Mar. 9, 1999, has been disclaimed.**

**Int. Cl.³ G01S *9/66***

**U.S. Cl. 73—155** **4 Claims**



1. An apparatus for determining the location of the liquid surface in a well drilled through the substrata of the earth comprising:

a source of acoustic pulses coupled to said well;

a transducer coupled to said well producing an electric signal in response to the occurrence of acoustic pulses in said well;

a clock pulse source;

digital counting means;

gating means responsive to the output of said transducer for starting the counting of clock pulses by said digital counting means upon the occurrence of an acoustic pulse in said well and for stopping said counting upon detection of the acoustic pulse reflected from the liquid surface in said well, said reflected pulses including a component reflected from the liquid surface having a frequency content about 5 Hz;

a digital readout device responsive to said digital counting means for indicating the depth of said liquid surface; and

means for gating out acoustic pulses for adjustable periods of time during and after the generation of each initiating acoustic pulse.

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**4,391,136**

## THREE-AXIS CURRENT METER

**Henry T. Perkins, Slidell, La.; Kim D. Saunders, Picayune, Miss., and Albert W. Green, Slidell, La., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Jun. 18, 1981, Ser. No. 274,857**

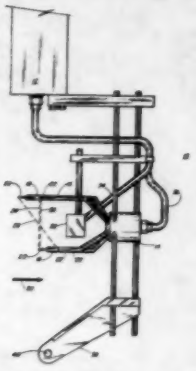
**Int. Cl.³ G01P *5/18, 13/02***

**U.S. Cl. 73—189** **4 Claims**

1. A three-axis current meter comprising:

a sensor assembly; and

a plurality of acoustic transducers mounted on the tips of fingers projecting upstream from said sensor assembly, said fingers being mounted on said sensor assembly, and



said acoustic transducers defining three intersecting acoustic paths which form a skewed coordinate system.

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**4,391,137**

## GROUNDWATER FLOW METER

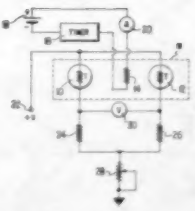
**William B. Kerfoot, Falmouth, and Stuart M. Skinner, Jr., Marion, both of Mass., assignors to K-V Associates, Inc., Falmouth, Mass.**

**Filed Jun. 24, 1981, Ser. No. 276,787**

**Claims priority, application Fed. Rep. of Germany, Jun. 28, 1980, 3024417**

**Int. Cl.³ G01F *1/68***

**U.S. Cl. 73—204** **20 Claims**



1. The method of measuring a flow characteristic of a fluid, which comprises the steps of:

(a) providing a heat conductive porous medium;

(b) heating a localized region of said heat conductive porous medium through which fluid is flowing, the heat conductivity of the porous medium being substantially greater than the heat conductivity of the fluid; and

(c) measuring the temperature of the medium at at least two regions spaced from said localized region and determining a flow characteristic of the fluid therefrom.

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**4,391,138**

## COLLECTING VESSEL

**Anton Harle, Schelmenstiege 8, D-4400 Munster, Fed. Rep. of Germany**

**Filed Jun. 12, 1981, Ser. No. 272,990**

**Claims priority, application Fed. Rep. of Germany, Jun. 21, 1980, 3023348**

**Int. Cl.³ G01F *3/38***

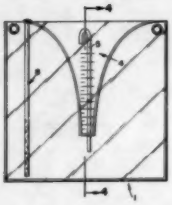
**U.S. Cl. 73—223** **5 Claims**

1. A flexible collecting vessel having a main pouch part and

a measuring pouch part, said measuring part, being tapered and having a narrow end and a wide end, said wide end of said measuring part in fluid communication with said main part;

a graduated measurment scale positioned along said tapered part, said graduations starting at said narrow end of said measuring part;

an inflow tube having a free end, said tube passing through said narrow end of said measuring part and extending in a



direction toward said main part for a distance and having a generally semicircular, U-shaped bend subtantially at said free end of said tube; and

suspension means affixed to said main part between said measuring part and said main part, said suspension means for suspending said vessel in a folded-over fashion so that said narrow end of said measuring part hangs downwardly from said affixment of said suspension means.

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**4,391,139**

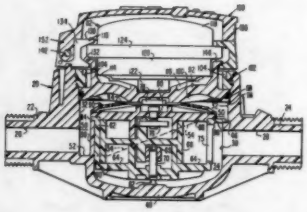
## PLASTIC WATER METER MAIN CASE

**Ray Sutherland, Hopewood, and Mark S. Wood, Lemont Furnace, both of Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.**

**Filed Feb. 24, 1982, Ser. No. 351,827**

**Int. Cl.³ G01F *15/14***

**U.S. Cl. 73—273** **4 Claims**



1. A water meter comprised of a main case enclosing an inlet chamber and a generally circular measuring chamber compartment, inlet and outlet passages in said main case communicating respectively with said inlet chamber and said compartment, a continuous compartment seating surface circumscribing said compartment including a first portion which is circular and concentric with the axis of said compartment and a second portion at a radial distance from said axis greater than the radius of said first portion, said portions of said seating surface being co-planar, a generally circular measuring chamber having a continuous downwardly facing seating surface circumscribing said measuring chamber and seated on said compartment seating surface and comprised of a first measuring chamber seating surface portion which is circular and coextensive and co-axial with said first portion of said compartment seating surface, and a second measuring chamber seating surface portion which projects beyond the radius of said first measuring chamber seating surface portion and is seated on the second portion of said compartment seating surface.

**4,391,140**

## METHOD AND APPARATUS FOR METERING PARTICULATE MATERIAL

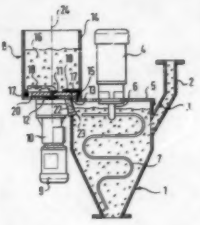
**Max Reinhard, and Horst Kornmayer, both of Bad Homburg, Fed. Rep. of Germany, assignors to Colortronic Reinhard & Co. KG, Friedrichsdorf, Fed. Rep. of Germany**

**Filed Jul. 13, 1981, Ser. No. 283,081**

**Claims priority, application Fed. Rep. of Germany, Jul. 25, 1980, 3038260**

**Int. Cl.³ G01M *19/00***

**U.S. Cl. 73—432 R** **10 Claims**



1. Apparatus for metering particulate material into a mixing vessel, comprising a vessel for containing a body of the particulate material, the vessel having a bottom plate, a metering disc disposed directly above the bottom plate in the containing vessel, the disc being mounted for rotation in a given direction and having apertures for separating respective portions from the body of material, the containing vessel having first and second apertures positioned so that each disc aperture comes successively into alignment with them, the first, upstream aperture being intended for connection to a sampling receiver, the second, downstream aperture being intended for connection to a mixing vessel, and covering means in the containing vessel arranged to cover the disc in the region above the first and second apertures in order to prevent the body of material from escaping through the aligned apertures.

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**4,391,141**

## APPARATUS FOR DETERMINING THE PROPERTIES OF A MATERIAL HAVING PLASTIC PROPERTIES BY DETERMINING ITS DENSITY

**Olfert H. Petersen, Lejre, Denmark, assignor to Slagteriernes Forskningsinstitut, Roskilde, Denmark**

**Filed Oct. 8, 1980, Ser. No. 195,305**

**Claims priority, application Denmark, Oct. 8, 1979, 4211/79**

**Int. Cl.³ G01N *9/02, 7/00***

**U.S. Cl. 73—433** **4 Claims**

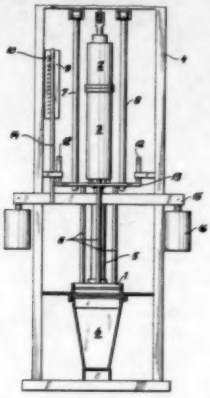
1. An apparatus for determining the properties of a material having plastic properties by determining its density on the basis of a measurement of weight and volume, which comprises:

a chamber for receiving said material;

a displacement member for contacting the material to thereby apply pressure to the material, which member is slidably movable through a wall of the chamber and has a cross sectional area perpendicular to the direction of movement smaller than the cross sectional area of the chamber in the cross section;

drive means connected to said member for applying a predetermined force on said displacement member towards the interior of the chamber, said drive means comprising means for applying a predetermined weight to said displacement member; and

measuring means for measuring the penetration depth of the displacement member into the chamber to thereby determine the volume of the material, the measured volume and weight being used to determine density of the product.



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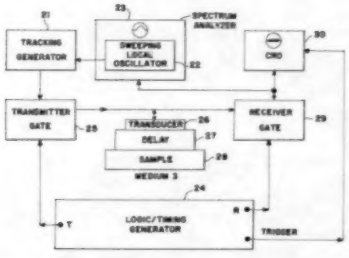
**4,391,142**

## FREQUENCY TRACKED GATED PULSE TECHNIQUE FOR ULTRASONIC FREQUENCY

**John H. Cantrell, Jr., Newport News, and Joseph S. Heyman, Gloucester, both of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Jun. 10, 1980, Ser. No. 158,183**
**Int. Cl.³ G01N *29/00*; G01H *9/24***
**U.S. Cl. 73—610** **3 Claims**




1. A device for obtaining an ultrasonic frequency analysis comprising:

a spectrum analyzer having a tuning frequency;

a tracking generator means connected to said spectrum analyzer for producing an RF source locked to the tuning frequency of said spectrum analyzer;

a transducer means suitable for attachment to the sample to be frequency analyzed;

a transmitter on-off gate connected between said tracking generator means and said transducer means;

a receiver on-off gate connected between said transducer means and said spectrum analyzer; and

circuit means connected to said transmitter gate and said receiver gate for gating pulses of the RF signal from the tracking generator to the transducer means through the transmitter gate and for gating selected durations not coinciding with the durations of said pulses the resulting echo signals from the transducer means to the spectrum analyzer through the receiver gate.

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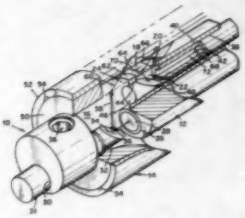
**4,391,143**

## ULTRASONIC PROBE FOR INSPECTING DOUBLE-WALL TUBE

**Kenneth V. Cook, Clinton; Robert A. Cunningham, Jr., Powell, and Horace T. Murrin, Alcoa, all of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed May 29, 1981, Ser. No. 268,424**
**Int. Cl.³ A61B *5/04*; G01N *29/00*; G01M *7/00***
**U.S. Cl. 73—623** **2 Claims**



1. An ultrasonic probe assembly for inspecting a double-wall structure, comprising:

a body member having first and second cavities extending inwardly from its periphery and spaced apart from each other axially of one side thereof, the portion of said body member disposed between said first and second cavities constituting a baffle wall blocking direct transmission of ultrasonic energy therebetween;

a first transducer mounted within said body member and operative to (1) transmit ultrasonic energy into said first cavity and (2) sense ultrasonic energy;

a first reflector mounted within said first cavity and aligned with said first transducer so as to receive ultrasonic energy therefrom and reflect it to said double-wall structure at a predetermined angle, said first reflector also receiving ultrasonic energy reflected back from said double-wall structure and reflecting it to said first transducer;

a second transducer mounted within said body member and operative to sense ultrasonic energy, said second transducer being spaced from said second cavity on the side thereof remote from said first cavity;

an aperture in said body member extending from said second cavity to said second transducer;

a tubular collimator insert mounted within said aperture; and

a second reflector mounted within said second cavity and arranged to receive ultrasonic energy reflected from the end of said collimator insert adjacent thereto and reflect it through said collimator insert to said second transducer.

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**4,391,144**

## ULTRASONIC TEST PROBE

**Rolf Diederichs, Hürth-Hermülheim, Fed. Rep. of Germany, assignor to Krautkramer-Branson, Inc., Stratford, Conn.**

**Filed Nov. 10, 1980, Ser. No. 205,303**
**Claims priority, application Fed. Rep. of Germany, Mar. 12, 1979, 2948552**
**Int. Cl.³ G01N *29/04***
**U.S. Cl. 73—629** **2 Claims**

1. An ultrasonic test probe comprising a housing in which is disposed:

(a) a piezoelectric transducer element adapted to transmit an ultrasonic seach pulse into a workpiece and to receive ultrasonic echo signals from such workpiece;

(b) an electrical circuit coupled to said transducer element

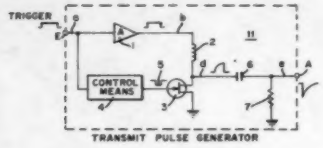
for periodically energizing said transducer element with a high voltage pulse, said circuit including;

(i) an electrical inductor coupled with one of its two terminals for receiving a trigger pulse;

(ii) an electrical switching means coupled serially between the other terminal of said inductor and ground potential;

(iii) control means coupled to said switching means and controlled by said trigger pulse for periodically rendering said switching means briefly non-conductive when said switching means is in its conductive state;

(iv) a capacitor coupled with one of its two terminals to




the junction between said inductor and said switching means, and

(v) a resistor coupled with one of its two terminals to ground potential and with its other terminal to the other terminal of said capacitor,

whereby responsive to the provision of a trigger pulse said control means renders said switching means non-conductive to cause a high voltage signal to form across said inductor which charges said capacitor with a potential, and responsive to said control means subsequently rendering said switching means conductive said capacitor discharges its potential to provide a high voltage pulse across said resistor which pulse is applied to said transducer element to energize said element.

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**4,391,145**

## FLUID-PRESSURE RESPONSIVE APPARATUS

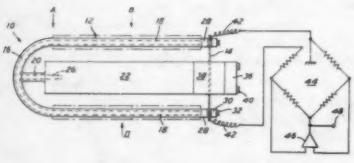
**Sylvain Janssen, Neuilly, and Jean Sequies, Rueil Malmaison, both of France, assignors to Giers, Montrouge, France**

**Filed Mar. 27, 1981, Ser. No. 248,620**

**Claims priority, application United Kingdom, Apr. 3, 1980, 8011351**

**Int. Cl.³ G01L *11/00***

**U.S. Cl. 73—704** **12 Claims**



1. Fluid-pressure responsive apparatus comprising:

elongate means at least a portion of which is hollow and curved, and a resilient member interconnecting two points on said elongate means which are separated by said hollow, curved portion, whereby application of fluid pressure within said portion causes a change in tension in said resilient member; and

means arranged to induce oscillation of said resilient member and to generate a signal related to the frequency of said oscillation; and wherein

at least the entirety of said hollow, curved portion of said elongate means is of unitary construction and said elongate means is placed under a predetermined amount of tension by said resilient member, whereby temperature sensitivity of said apparatus is reduced.

**4,391,146**

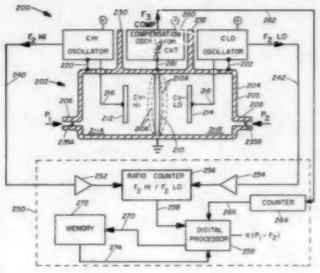
## PARALLEL T IMPEDANCE MEASUREMENT CIRCUIT FOR USE WITH VARIABLE IMPEDANCE SENSOR

**Earl A. Grindheim, Richfield, Minn., assignor to Rosemount Inc., Minneapolis, Minn.**

**Filed Jun. 1, 1981, Ser. No. 269,415**

**Int. Cl.³ G01L *9/12***

**U.S. Cl. 73—718** **34 Claims**




34. A circuit for providing an output signal having a frequency which is representative of a sensed parameter, the circuit comprising:

sensing means for sensing the parameter, the sensing means exhibiting a variable impedance which is a function of the parameter;

controllable impedance means for providing a controllable impedance which is a function of a direct current control signal;

frequency determining means, connected to the sensing means and the controllable impedance means to form a parallel T circuit, for receiving the output signal and providing an oscillatory frequency signal which has a frequency which is a function of the variable impedance and the controllable impedance;

signal amplification means for amplifying the oscillatory frequency signal to produce the output signal; and

detection means for providing the direct current control signal to the controllable impedance means as a function of amplitude of the output signal.

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**4,391,147**

## TRANSDUCER DEVICE FOR MEASURING MECHANICAL VALUES ON HOLLOW BODIES

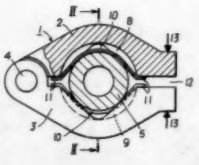
**Peter W. Krempl, Vienna; Peter Claassen, and Rudolf Zeiringer, both of Graz, all of Austria, assignors to Hans List, Graz, Austria**

**Filed Mar. 11, 1981, Ser. No. 242,456**

**Claims priority, application Austria, Mar. 19, 1980, 1501/80**

**Int. Cl.³ G01L *7/02*; H01L *41/18***

**U.S. Cl. 73—730** **17 Claims**



1. A transducer device for measuring mechanical values on hollow bodies, especially for measuring pressure distributions within a pipe by detecting deformations in the outer surface thereof, comprising a housing for detachably enclosing the

pipe whose outer surface deformation is to be measured, and at least one elastic sensor element being mounted in said housing, said sensor element being capable to at least indirectly contact the surface of said enclosed pipe and having electrical connections for taking off the measuring signals, said sensor element further being connected to at least two points of said housing and having a free length between said connecting points so as to be stretched over the surface of the pipe when the transducer device is attached, and wherein at least one part of said sensor element is made in one piece with said housing.

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**4,391,148**

## METHODS AND APPARATUS FOR MEASURING THE CROSS-SECTIONAL AREA OF A DUCT AND THE VOLUME FLOW RATE OF FLUID IN THE DUCT

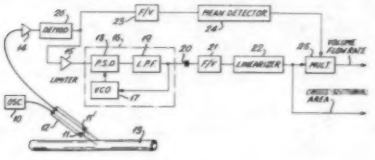
**Antonio J. Sainz, and Victor C. Roberts, both of London, England, assignors to National Research Development Corporation, London, England**

**Filed Feb. 27, 1981, Ser. No. 238,952**

**Claims priority, application United Kingdom, Feb. 29, 1980, 8007008; Jun. 11, 1980, 8019049**

**Int. Cl.³ A61B 5/10; G01F 1/66**

**U.S. Cl. 73—861.25** **9 Claims**




1. Apparatus for measuring the cross-sectional area of a duct containing a fluid, comprising

means for deriving a plurality of velocity signals, each having a frequency which corresponds to a respective velocity of fluid in a duct, the number of velocity signals depending on the number of different velocities currently present in the duct,

a frequency-to-voltage converter coupled to receive the velocity signals, and

means responsive to the varying output of the said converter to provide a signal representative of duct cross-sectional area.

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**4,391,149**

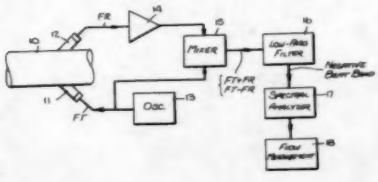
## DOPPLER-TYPE ULTRASONIC FLOWMETER

**Peter J. Herzl, Morrisville, Pa., assignor to Fischer & Porter Company, Warminster, Pa.**

**Filed May 15, 1981, Ser. No. 263,473**

**Int. Cl.³ G01F 1/66**

**U.S. Cl. 73—861.25** **7 Claims**




1. A Doppler-type ultrasonic flowmeter for measuring the mean flow velocity of a fluid stream carrying contaminants passing through a pipe, said stream having a changing velocity profile, said flowmeter comprising:

A. a transmitting transducer mounted on the pipe to project in the upstream direction therein a diverging beam of ultrasonic energy;

B. a stable oscillator coupled to the transmitting transducer to excite same at a predetermined ultrasonic frequency;

C. a receiving transducer mounted on the pipe to pick up ultrasonic energy reflected by moving contaminants in the fluid which lie within the zone in which the projected beam intersects a converging reception beam leading downstream to the receiving transducer to produce a Doppler signal;

D. means responsive to the transmitted frequency and the Doppler signal to produce a band of negative beat frequencies which are determined by the disparate flow velocities of the reflecting contaminants dictated by the prevailing velocity profile; and

E. means responsive to the band of negative beat frequencies to determine the prevailing velocity profile and to derive therefrom the mean flow velocity, said means including spectral analyzer which sweeps through a frequency range that includes said band, the analyzer functioning to measure the amplitude output of each frequency in the band to provide a spectral analysis.

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**4,391,150**

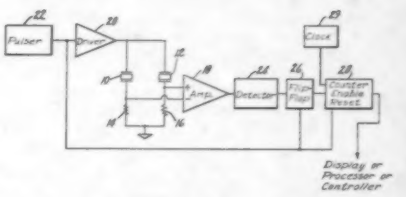
## ELECTRO-ACOUSTIC FLOWMETER

**Thomas J. Rey, 319 Nashua Rd., Bedford, Mass. 01730**

**Filed Dec. 15, 1980, Ser. No. 216,667**

**Int. Cl.³ G01F 1/66**

**U.S. Cl. 73—861.29** **7 Claims**




1. A flowmeter for measuring the velocity of fluid flow in a conduit comprising a pair of transducers mounted in spaced apart relationship in the direction of fluid flow on the exterior of the conduit, each of the transducers being tuned to its resonant frequency near that of the other, excitation means for causing both of the transducers to emit sonic energy intermittently and at the same time through the wall of the conduit and into the fluid, amplifier means for processing upstream and downstream travelling signals received by the transducers including a differential amplifier to which both transducers are connected, whereby signals carried through the isotropic medium of the wall of the conduit simultaneously between the transducers produce zero differential signals at the input of the differential amplifier, counting means controlled by the downstream signal and the upstream signal and means for converting the counts into fluid velocity.

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**4,391,151**

## CIRCULAR TWO-STAGE AIR PARTICULATE AND GAS SAMPLER

**John W. Nelson, and Bruno Jensen, both of Tallahassee, Fla., assignors to PIXE International Corporation, Tallahassee, Fla.**

**Filed Jun. 26, 1981, Ser. No. 277,833**

**Int. Cl.³ B01D 50/00; G01N 1/22**

**U.S. Cl. 73—863.23** **6 Claims**

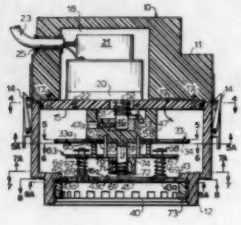
2. A sampling device for the particulate matter of air and gaseous fluids comprising:

(a) a chamber (19) having an inlet (40) and an outlet (31);

(b) a vacuum pump (**30**) for sucking said fluid through said inlet into said chamber and through said outlet;

(c) a collector member (**41**) with an associated orifice member (**44, 45**) at said inlet and adapted to retain from said fluid the coarser particulates of a predetermined size and larger, and to transmit therefrom the finer particulates into said chamber, one of said members being disposed within said chamber and rotatable relative to the other member;

(d) a second collector member (**34**) with an associated second orifice member (**32, 39**) disposed within said chamber and adapted to retain from said finer particulates transmitted to said chamber those particulates of a predetermined



size and larger, and to transmit therefrom the remaining finer particulates to said outlet, said second collector member (**34**) being rotatable relative to said second orifice member (**32, 39**) and about an axis (**46**) common to the axis of rotation of said first rotatable member (**44, 45**), and

(e) means (**20, 63**) for effecting rotary movement of said first rotatable member to chronologically form a circular arcuate deposit (**41***a*) of said coarser particulates on said first collector member and, concurrently, for effecting rotary movement of said second collector member (**34**) to chronologically form a circular arcuate deposit (**34***a*) of said remaining finer particulates retained by said second collector member.

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**4,391,152**

**SAMPLER**

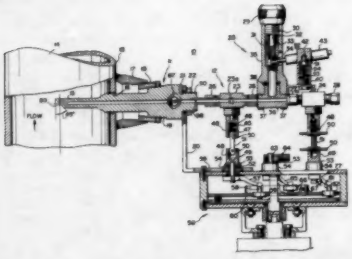
**James R. Ellett, Edmonton, Canada, assignor to Bralorne Resources Limited, Vancouver, Canada**

**Filed May 28, 1981, Ser. No. 267,856**

**Claims priority, application Canada, Dec. 16, 1980, 366918**

**Int. Cl.³ G01N *1/14***

**U.S. Cl. 73—863.84** **29 Claims**



**1.** A sampling device for taking fluid samples, said device comprising a probe adapted to extend into fluid and to act as an intake port, a housing connected to said probe, first valve means in said housing adapted to allow admittance of a portion of said fluid, second valve means adapted to allow exit of said admitted fluid to a storage container, sample holding means adapted to hold a predetermined amount of said admitted fluid, actuating means adapted to open and close said first and second valve means at predetermined intervals to allow for said admittance and exit of said fluid, respectively, and a substantially uninterrupted passageway for said fluid extending through said housing and probe, said passageway being adapted to allow for the admission of cleaning means to clean said passageway without disassembly of said probe and housing.

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**4,391,153**

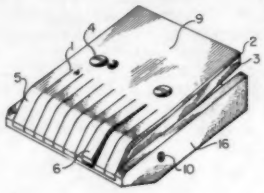
**SEGMENTED FIBER SAMPLER**

**Robert A. Taylor, Anderson, S.C., assignor to The United States of America as represented by the United States Department of Agriculture, Washington, D.C.**

**Filed Jan. 4, 1982, Ser. No. 337,044**

**Int. Cl.³ G01N *3/10***

**U.S. Cl. 73—864.41** **2 Claims**



**1.** An apparatus for sampling staple fibers comprising in combination:

(a) a rigid lower jaw;

(b) an upper jaw juxtaposed to said lower rigid jaw, one end of said upper jaw fabricated into a plurality of segments, said segments capable of deflecting in different amounts to accommodate local differences in fiber density and/or imbedded trash/foreign particles;

(c) means for pivoting said upper jaw in relation to said rigid lower jaw;

(d) a spring assembly located between said upper and lower jaws, said spring assembly also located on the opposite end from the segmented end of said upper jaw to provide clamping pressure during and after the taking of a sample.

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**4,391,154**

**VARIABLE SPEED DIGGING MACHINE PROVIDED WITH A GEARBOX HAVING AN ORIENTABLE DRIVE**

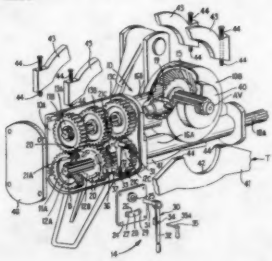
**Michele Tortella, Zona Industrial, Madonna delle Grazie-Ortona (Chieti), Italy**

**Filed May 6, 1980, Ser. No. 147,219**

**Claims priority, application Italy, May 11, 1979, 49033 A/79**

**Int. Cl.³ F16H *37/00, 3/22, 57/02***

**U.S. Cl. 74—15.4** **12 Claims**



**1.** In a digging machine including a longitudinal frame supporting at least one hoe-driving shaft driven by a main drive shaft for coupling to the power takeoff of a tractor operating the digging machine, the improvement comprising:

(a) an elongate gearbox carried by the machine;
(b) means for supporting the elongate gearbox for movable orientation in a vertical plane about the longitudinal axis of the machine;
(c) the gearbox supporting the main drive shaft of the machine and interposed between the main drive shaft and the hoe-driving shaft;
(d) a first gear shaft connected to and driven by the main drive shaft;
(e) a second gear shaft for driving the hoe-driving shaft;
(f) the first and second gear shafts being journaled through the gearbox;
(g) a first gear set including three gears mounted on the first gear shaft;
(h) a second gear set including three gears mounted on the second gear shaft; and
(i) each gear of the second gear set being engageable with and selectively driven by a corresponding gear of the first gear set, with the diameters of the corresponding gears being such that the second gear shaft may be driven by the first gear shaft at any one of three different speeds depending upon which corresponding gears of the first and second gear shafts are in selected driving engagement with each other for transmitting the motion of the first gear shaft to the second gear shaft.

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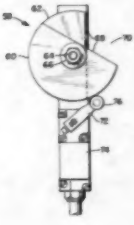
**4,391,155**
**RECIPROCATING DRIVE AND REVERSING MECHANISM FOR LONG STROKE, WELL PUMPING UNIT**

**Emil A. Bender, 6625 Kane Way, Bakersfield, Calif. 93309**
**Filed Jun. 28, 1982, Ser. No. 393,100**
**Int. Cl.³ F16H *27/02, 29/02;* F04B *47/06***
**U.S. Cl. 74—89.2** **5 Claims**

1. A long stroke, well pumping unit comprising: a base platform; a tower on the base platform; drive train means including rotatable, winding drum means on the base platform and power means to rotate the drum means; a flexible lift belt attached at one end to the drum means and at its other end to the polish rod of a pump; a freely rotatable spool mounted atop the tower, the belt being trained over the spool; a counterweight attached to that portion of the lift belt between the spool and the rotatable drum; and means for reversing the power means, thus to cyclically wind and unwind the belt from the winding drum and thus impart reciprocating movement to the polish rod of a pump, said reversing means including: rotary motion transmission means responsive to rotation in the drive train means; control means responsive to said transmission means; and a three position limit switch operable from said control means, the switch being arranged to cause the power means to rotate the winding drum clockwise in a first position and counterclockwise in a second position, the third position of the switch being an off position and providing a dwell or rest period between reversals of said power means, the control means being arranged to move the limit switch to the third position when the counterweight is in its lowermost position



and to maintain the limit switch in one of the first or second positions at all other times.

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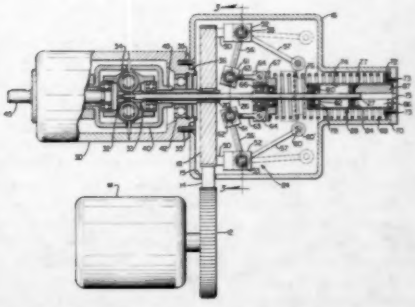
**4,391,156**
**ELECTRIC MOTOR DRIVE WITH INFINITELY VARIABLE SPEED TRANSMISSION**

**Edward C. Tibbals, Jr., Greensboro, N.C., assignor to William R. Loeffler, Denver, Colo.**
**Filed Nov. 10, 1980, Ser. No. 207,190**
**Int. Cl.³ F16H *5/44***
**U.S. Cl. 74—336.5** **18 Claims**



1. A variable speed drive for motor vehicles and the like

characterized by having an output shaft with high torque requirements at low speeds of operation, the combination comprising:

an electric motor drive;

infinitely variable speed transmission means having an input driven by said motor drive and an output coupled to a vehicle to be driven, said infinitely variable speed transmission means including a movable control member shiftable to vary the speed ratio between the input and output of said transmission means over a predetermined range of speed ratios;

speed ratio control means operatively coupled to said movable control member, said control means movable in response to rotation of said motor drive to vary the ratio of the output speed and torque at the output side of said transmission with respect to the input speed and torque; and

resistance compensator means for imposing a predetermined resistance to movement of said control means whereby to control the speed ratio between the input side and the output side of said infinitely variable speed transmission, the maximum output speed of said transmission means being matched to the most efficient operating speed of said electric motor drive.

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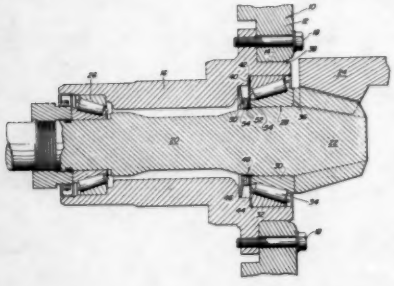
**4,391,157**

## BEVEL GEAR AND PINION DRIVE WITH BIASED THRUST BEARING

**Roger L. Jacklin, Waterloo, Iowa, assignor to Deere & Company, Moline, Ill.**

**Filed Oct. 17, 1980, Ser. No. 198,076**
**Int. Cl.³ F16H *35/08, 1/14***
**U.S. Cl. 74—402** **3 Claims**



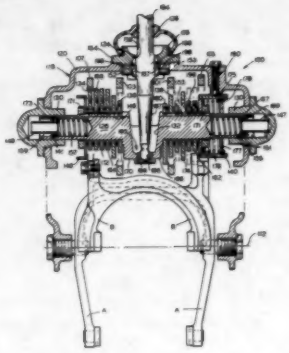
1. Drive mechanism including a fore-and-aft shaft having a spiral bevel pinion fixed at its rear end, a spiral bevel gear meshing with the pinion, a combination radial-thrust bearing including an inner race ring fitting the shaft so as to receive forward thrust forces imparted thereto by the meshing pinion and gear, an outer race ring and rolling elements between the rings, and fixed support structure carrying the bearing, characterized in that the support structure has a stepped annular groove therein concentrically surrounding the shaft ahead of the bearing and including a first radial shoulder facing toward and axially abutting the outer race ring and a second radical shoulder of lesser diameter than the first shoulder and spaced ahead of and facing the inner race ring and biasing means is disposed in the groove and is interposed between the second shoulder and the inner race ring in opposition to the aforesaid thrust forces.

**4,391,158**

## BIASED TRANSMISSION CONTROL SHAFT

**Theodore A. Malott, and Robert W. Wolfe, both of Jackson, Mich., assignors to Clark Equipment Company, Buchanan, Mich.**

**Filed Jan. 29, 1981, Ser. No. 230,781**
**Int. Cl.³ G05G *9/12, 5/10***
**U.S. Cl. 74—473 R** **5 Claims**



1. A transmission having a plurality of speed ratios comprising:

a housing;

a shift lever pivotally connected with the housing, the shift lever having a lower end extending through the housing;

a control shaft contained in the housing and operably associated with the shift lever, the control shaft being shiftable in opposed directions in response to pivotal movement of the shift lever, the control shaft having two ends, one of the ends having an internal bore;

a bias assembly operably associated with the control shaft for resisting the shifting of the control shaft in a selected direction past a predetermined point, the bias assembly being mounted in the internal bore and projecting therefrom, whereby a first amount of resistance is provided to enable the operator to sense his position in the transmission shift pattern.

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**4,391,159**

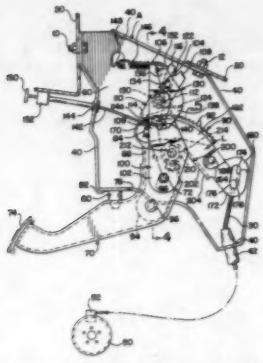
## PARKING BRAKE ACTUATING DEVICE

**Daniel J. Sellmeyer, Royal Oak, Mich., assignor to Gulf & Western Manufacturing Company, Southfield, Mich.**

**Filed Dec. 3, 1980, Ser. No. 212,270**
**Int. Cl.³ G05G *1/04***
**U.S. Cl. 74—516** **23 Claims**

1. In a parking brake operating mechanism for a vehicle, which mechanism includes a support structure; a pedal actuated lever; means for mounting said lever on said structure to pivot about a fixed axis; a movable force transmitting means for applying an actuating force to a brake actuating element upon movement of said force transmitting means along a preselected path between a brake release position and a brake actuating position; coupling means for connecting said force transmitting means to said pedal actuated lever to move said force transmitting means along said preselected path as said pedal actuated lever is pivoted about said fixed axis; and, means for releasably locking said force transmitting means in said brake actuating position on said path, the improvement comprising: said coupling means comprises a drag link having first and second spaced ends; means for pivotally connecting said first end to said pedal actuated lever on a second axis spaced from said fixed axis whereby said first end of said drag link is moved with said second axis in an arcuate path generally concentric with said fixed axis; means for connecting said force transmitting

means onto said second end of said drag link; and, cam means for pivoting said drag link about said second axis on said pedal



actuated lever as said first end of said drag link is moved in said arcuate path by pivotal movement of said pedal actuated lever.

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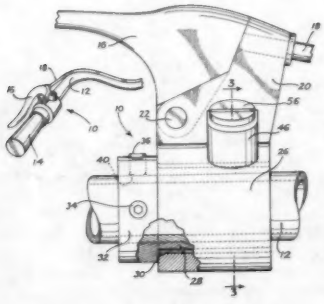
**4,391,160**

## SUPPORT ASSEMBLY HAVING RELEASABLE LEVER MOUNTING FOR HANDLE BAR

**John E. Myers, Star Rte., Echo, Oreg. 97826**

**Filed Nov. 10, 1980, Ser. No. 205,316**
**Int. Cl.³ B62K 21/12**
**U.S. Cl. 74—551.8** **3 Claims**



1. A support assembly for securing a mechanical device on a bar comprising

an annular sleeve for encompassing and fixable to such bar,

a tubular base portion encompassing said sleeve,

a post laterally projecting from and integral with said base portion adapted for attaching to such device,

releasable means releasably locking said base portion to said sleeve, said base portion being movable relative to said sleeve with release of said releasable means, and

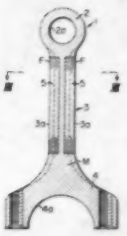
a tubular bushing positioned between said sleeve and said base portion for facilitating movement of said base portion relative to said sleeve with release of said locking means.

**4,391,161**

## CONNECTING ROD OF INTERNAL COMBUSTION ENGINE

**Keisuke Ban, Fujimi, and Takeo Arai, Higashimatsuyama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 25, 1980, Ser. No. 181,227**
**Claims priority, application Japan, Aug. 29, 1979, 54-109854**
**Int. Cl.³ G05G 1/00**
**U.S. Cl. 74—579 E** **3 Claims**



1. A connecting rod of an internal combustion engine including a rod portion having longitudinal stiffening rib portions, a longitudinal axis and two ends, a big end portion connected to one end of said rod portion and being adapted to be connected to a crankshaft of the engine, and a small end portion connected to the other end of said rod portion having a hole bored therethrough for receiving a piston pin having an axis; said rod portion having a Y-axis perpendicular to said longitudinal axis and parallel to said axis of said piston pin and an X-axis perpendicular to both said Y-axis and said longitudinal axis; said rod portion comprising at least one reinforced portion and a remaining portion; said remaining portion being made of a light alloy material, said at least one reinforced portion being made of a bundle of inorganic fibers extending along said longitudinal axis formed into a metal matrix impregnated with said light alloy material; said fibers having a cross-sectional area; said rod portion having a cross-sectional area, a cross-sectional shape, a Y-axis second moment of inertia, and an X-axis second moment of inertia; said at least one reinforced portion having a cross-sectional area and a Y-axis second moment of inertia; said cross-sectional shape of said rod portion taken perpendicular to said longitudinal axis being such that said Y-axis second moment of inertia of said rod portion is smaller than said X-axis second moment of inertia of said rod portion; and said reinforced portion being positioned and sized in said rod portion such that said Y-axis second moment of inertia of said reinforced portion is equal to or greater than said X-axis second moment of inertia of said reinforced portion.

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**4,391,162**

## FLUID ASSISTED BOOSTER

**John P. Burke, Leamington Spa, England, assignor to Automotive Products Limited, Leamington Spa, England**

**Filed Sep. 2, 1980, Ser. No. 183,579**
**Claims priority, application United Kingdom, Sep. 5, 1979, 79 30723**
**Int. Cl.³ G05G 1/00**
**U.S. Cl. 74—579 R** **4 Claims**

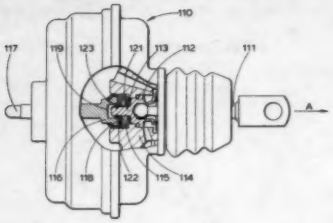
1. A fluid assisted brake booster having:

an output rod with a piston head thereon having a load bearing face with an axial bore therein;

an annular load transfer means located adjacent the load bearing face;

an input rod located on the other side of the transfer means relative to the output rod and having a thrust member with an axial projection that extends through the centre of the transfer means into said axial bore; and a cap fitted to the load bearing face to provide anchorage means for the

thrust member to the piston head, said anchorage means allowing the thrust member a forward stroke towards the




output rod to apply a load to the load transfer means but limiting the relative displacement of the thrust member on the return stroke.

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**4,391,163**

## PLANETARY GEAR ASSEMBLY

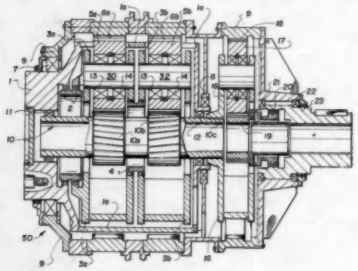
**Heinz Benthake, Kassel; Curt Krönert, Mülheim, and Josef Kunnen, Meerbusch, all of Fed. Rep. of Germany, assignors to Thyssen Industrie AG, Fed. Rep. of Germany**

**Filed May 23, 1980, Ser. No. 152,607**

**Claims priority, application Fed. Rep. of Germany, Feb. 14, 1980, 3005463**

**Int. Cl.³ F16H *3/44, 1/28***

**U.S. Cl. 74—768** **3 Claims**



**1.** A planetary gear assembly comprising a housing (**9**), an input shaft (**1**) rotatably mounted in said housing, an output shaft (**23**) mounted for rotation adjacent said input shaft, a pair of outer central internal gears (**6***a*,**6***b*) fixed to said housing, an inner central gear (**10**) having two axially spaced opposite helical gear portions (**10***a*,**10***b*), first and second substantially parallel rotatable planetary gears (**5***a*,**5***b*) having oppositely helically geared portions disposed between said outer central internal gears and said inner central gear and in meshing engagement with said outer central internal gears and said axially spaced opposite helical gear portions of said inner central gear, first and second carriers (**3***a*,**3***b*) for supporting said first and second planetary gears for rotation respectively, and for revolving movement around said inner central gear, a first gear coupling (**2**) connecting said first carrier (**3***a*) to said input shaft for co-rotation and relative axial motion for transmitting all rotational power from said input shaft to said first carrier, a second gear coupling (**4**) connecting said first and second carriers (**3***a*,**3***b*) for co-rotation and relative axial motion so that a portion of the rotational power from said first carrier is transmitted to said second carrier over said second gear coupling and a remainder of the power is transmitted directly to said central gear over one of said opposite helical gear portions, and bearing means (**11**,**12**) mounting said inner central gear for rotation and for axial displacement in a fixed radial position in said housing.

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**4,391,164**

## OVERDRIVE FOR MOTOR VEHICLES

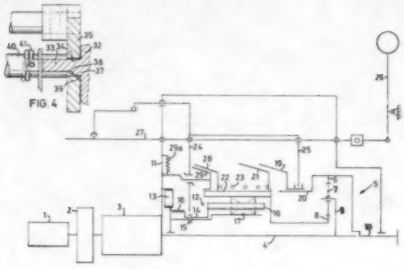
**Stig H. A. Weiertz, Kungälv, and Grzegorz K. Janiszewski, Angered, both of Sweden, assignors to AB Volvo, Gothenburg, Sweden**

**Filed Nov. 4, 1980, Ser. No. 204,082**

**Claims priority, application Sweden, Nov. 22, 1979, 7909663**

**Int. Cl.³ F16H *57/10***

**U.S. Cl. 74—781 R** **7 Claims**




**1.** In an overdrive for motor vehicles, comprising a housing for the overdrive, a planet carrier which is joined to an input shaft, a ring gear with internal teeth, which ring gear engages planet pinions carried on the planet carrier and is joined to an output shaft, a sun pinion engaging the planet pinions, a one-way brake coupled between the housing of the overdrive and the sun pinion, said one-way brake being arranged to lock the sun pinion to the housing when driving torque is transmitted from the input shaft to the output shaft, and a clutch which is disposed, when engaged, to establish non-rotatable connection between the sun pinion and the ring gear, and means to suspend the braking function of the one-way brake before the clutch is engaged; the improvement comprising brake means that brake the sun pinion after disengagement of the clutch and prior to the establishment of the braking function of the one-way brake.

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**4,391,165**

## KICK-DOWN SHIFTING MECHANISM FOR AUTOMATIC CHANGE-SPEED TRANSMISSIONS

**Hermann Gaus, Stuttgart, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jul. 21, 1980, Ser. No. 169,521**

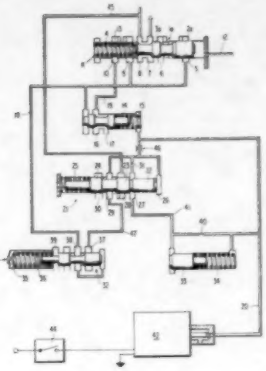
**Claims priority, application Fed. Rep. of Germany, Jul. 21, 1979, 2929729**

**Int. Cl.³ B60K *41/10***

**U.S. Cl. 74—869** **8 Claims**

**1.** A kick-down circuit for an automatic change-speed transmission, the circuit including a kick-down control means for transmitting a kick-down control signal when an accelerator pedal of a vehicle in which the transmission is installed is displaced to a predetermined position, at least one gearshift valve means including a valve body for controlling an operating pressure of a shift-actuating means which participates in a shifting between a higher gear and a lower gear, means for setting a control pressure acting upon the valve body is dependence upon a driving speed of the vehicle for shifting from a lower gear to a higher gear, and means for setting a control pressure acting upon the valve body in dependence upon a positioning of the accelerator pedal for shifting from a higher gear to a lower gear, characterized in that means are provided for elevating the control pressure dependent upon the position of the accelerator upon the occurrence of a kick-down signal,

and in that means are operatively connected with the control pressure elevating means for limiting a duration of the elevated



control pressure acting upon the valve body independently of the position of the accelerator pedal.

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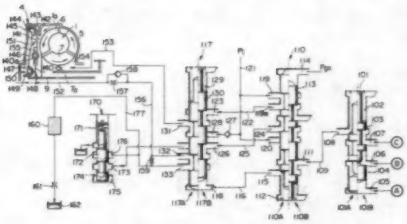
**4,391,166**

## HYDRAULIC FLUID PRESSURE CONTROL SYSTEM FOR AN AUTOMATIC TRANSMISSION

**Seitoku Kubo, Toyota; Koujiro Kuramochi, Okazaki, and Yukio Terakura, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Aug. 1, 1980, Ser. No. 174,510**
**Claims priority, application Japan, Sep. 10, 1979, 54-116563**
**Int. Cl.³ F16H *47/08*; B60K *41/10***
**U.S. Cl. 74—869** **6 Claims**



**1**. In an automatic transmission, for a vehicle comprising a throttle, comprising: a fluid torque converter having input and output members, a lock-up clutch formed with a hydraulic pressure chamber which directly connects said input and output members when hydraulic fluid pressure is supplied to the hydraulic pressure chamber; and a gear transmission mechanism comprising a plurality of hydraulic fluid actuated friction engaging devices for providing a plurality of speed stages;

a hydraulic fluid pressure control system which provides selective supply of hydraulic fluid pressures for actuating the plurality of friction engaging devices, comprising:

(a) a throttle hydraulic fluid pressure control valve for producing a throttle hydraulic fluid pressure according to the amount of actuation of the throttle;

(b) a governor hydraulic fluid pressure control valve for producing a governor hydraulic fluid pressure according to the speed of the vehicle;

(c) means for manually selecting any of a plurality of desired shift ranges;

(d) a plurality of shift valves for selectively providing actuating hydraulic fluid pressures for the plurality of friction engaging devices, according to the shift range selected by the manual selecting means, and according to the values of the throttle hydraulic fluid pressure and the governor hydraulic fluid pressure; and

(e) leading means for leading hydraulic fluid pressure to the hydraulic fluid pressure chamber of the torque converter, when any one of a plurality of shift ranges is selected by the manual selecting means, only when the highest speed stage available from the gear transmission mechanism, for that shift range, is being provided by the gear transmission mechanism;

said leading means includes a hydraulic fluid pressure switching valve comprising an output port, leading to the hydraulic fluid pressure chamber of the torque converter, and a first, a second, and a third input port;

in the hydraulic fluid pressure switching valve, the output port being connected to the third input port when and only when hydraulic fluid pressure is provided to either the first input port or the second input port;

the first input port being provided with a hydraulic fluid pressure whenever the highest speed range available for the automatic transmission is not selected by the selecting means;

the second input port being provided with a hydraulic fluid pressure which is an actuating pressure for a one of the friction engaging devices which is engaged only for producing the highest speed stage available from the gear transmission mechanism and is otherwise disengaged;

and the third input port being provided with a hydraulic fluid pressure which is an actuating pressure for a one of the friction engaging devices which is engaged for providing the highest and also the next to highest speed stage available from the gear transmission mechanism, and is otherwise disengaged, during forward operation of the gear transmission mechanism.

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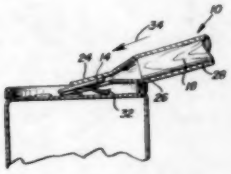
**4,391,167**

## LIFT-TOP CAN OPENER

**Josef J. Bergmeister, 620 Jones, San Francisco, Calif. 94102**

**Filed Dec. 23, 1981, Ser. No. 333,726**
**Int. Cl.³ B67B *7/40***
**U.S. Cl. 81—3.46 R** **3 Claims**

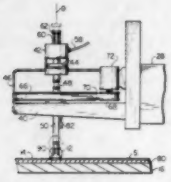



**1**. A lift top can opener including an elongated lever member defining first and second ends, said first end defining an elongated handle and said second end including recess means defining an endwise outwardly opening recess having a first narrow cross sectional dimension and a second wide cross sectional dimension several times the first narrow dimension, said recess being adapted to receive therein the lift tab of a top can with said lever member thereafter being usable as an operating lever to assist in lifting the lift tab, said elongated handle including at least one cylindrical end, said recess means including a cylindrical sleeve having one partially flattened end and the other end of said sleeve being snugly telescoped over said one cylindrical end of said handle for stationary support of said sleeve from said handle, said recess being defined within said partially flattened end, one of the flattened sides of said partially flattened end including an integral laterally outwardly struck portion defining a hook spaced laterally outward of said one flattened side and opening toward the other end of said sleeve.

## 4,391,168
## METHOD FOR CUTTING SHEET MATERIAL WITH A CUTTING WHEEL

**Heinz J. Gerber, and David R. Pearl, both of West Hartford, Conn., assignors to Gerber Garment Technology, Inc., South Windsor, Conn.**

**Division of Ser. No. 168,312, Jul. 10, 1980. This application Dec. 8, 1981, Ser. No. 328,788**
**Int. Cl.³ D06H *7/00*; B26D *1/18***
**U.S. Cl. 83—34** **3 Claims**



1. A method of cutting pattern pieces from a single ply of sheet material comprising:

spreading a single ply of sheet material on a hard support surface in a smooth and flattened condition;

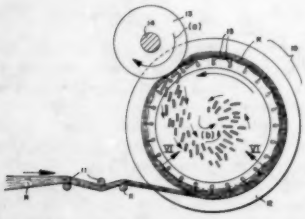
translating a cutting wheel having a sharp peripheral cutting edge along straight and curved lines of cut defining the perimeter of a pattern piece with the cutting edge cutting through the material to the hard support surface; and

at angles in the perimeter translating the cutting wheel along one side of the angle toward the apex of the angle, stopping the translating when the center of the wheel is directly over the apex, then lifting the cutting wheel away from the support surface and rotating the wheel above the surface into alignment with the other side of the angle, then lowering the cutting wheel into engagement with the sheet material and the support surface with the center of the wheel directly over the apex of the angle, and thereafter advancing the wheel along the other side of the angle away from the apex whereby the angle is cut without overcuts or excessive heel cuts.

## 4,391,169
## CUTTER WITH ANGULAR BLADES AND METHOD FOR CUTTING ROPE THEREWITH

**William F. Laird, and Kenneth A. Wood, both of Kingston, Canada, assignors to Hartford Fibres, Ltd., Ontario, Canada**

**Filed Aug. 11, 1980, Ser. No. 176,917**
**Int. Cl.³ D10G *1/04***
**U.S. Cl. 83—37** **21 Claims**

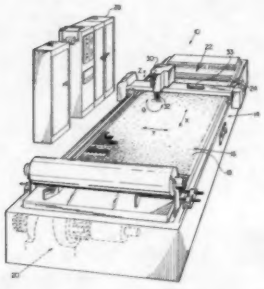


11. In a method of cutting a rope wherein said rope is laid out lengthwise against a plurality of cutting blades which are spaced apart from one another, and which is cut into fibers by forcing the rope against the cutting edges of the blades and forcing the cut fibers through the spaces between the blades, the step which comprises cutting said rope while maintaining said blades at an angle to the lengthwise orientation of said rope at an angle to a line perpendicular thereto, and with all of said blades angled toward the same side of the perpendicular, thereby causing the fibers to undergo angular bodily swinging movement after cutting and while passing through the spaces between the blades.

## 4,391,170
## APPARATUS FOR WORKING ON ADVANCING SHEET MATERIAL

**Bentsion Boverman, and Vilen Vodyanitsky, both of West Hartford, Conn., assignors to Gerber Garment Technology, Inc., South Windsor, Conn.**

**Filed Jan. 12, 1981, Ser. No. 224,650**
**Int. Cl.³ D06H *7/00***
**U.S. Cl. 83—71** **19 Claims**



1. In an apparatus for working on sheet material and having conveying means for supporting and moving sheet material, a carriage assembly, means supporting the carriage assembly for movement relative to the conveyor means and in one and an opposite direction generally parallel to the direction of movement of the conveyor means, instrument means mounted on said carriage assembly for movement with the carriage assembly and in working relation to sheet material supported by the conveyor means, and drive means for moving the carriage assembly relative to the conveyor means to move the instrument in working relation to the sheet material supported by the conveyor means, the improvement wherein said drive means comprises coengaging drive elements including one drive element mounted on the conveyor means to move with the conveyor means and another drive element supported on the carriage assembly to move with the carriage assembly and relative to the conveyor means.

## 4,391,171
## TRIM PRESS INCLUDING EJECTOR

**Michael Wendt, Hope, Mich., assignor to Lyle Development, Inc., Beaverton, Mich.**

**Filed Oct. 14, 1980, Ser. No. 196,207**
**Int. Cl.³ B26F *1/02***
**U.S. Cl. 83—82** **4 Claims**

1. In a trim press for trimming articles, which have been differentially pressure formed in a plastic sheet, from the plastic sheet comprising:

a frame;

means for incrementally indexing said sheet of plastic to successively position articles at a trim station;

first and second trim dies mounted on said frame for relative movement toward and away from each other between spaced apart positions and closed positions in which the trim dies engage opposite sides of said plastic sheet to sever the articles from the sheet at said trim station;

means for reciprocally moving at least one of said trim dies toward and away from the other of said trim dies comprising:

a flywheel rotatably mounted about a first axis on said frame;

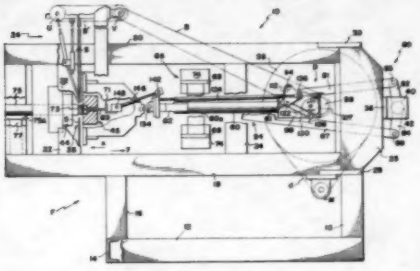
a first eccentric drive pin having a second axis radially offset from said first axis, mounted on said flywheel for bodily movement about a third axis;

first coupler means coupling said eccentric drive pin to said one trim die to reciprocally move said one trim die; and

ejector means reciprocally mounted on said one trim die for movement relative thereto; and the improvement comprising:

means for moving said ejector means relative to said one trim die comprising:

rocker arm means mounted on said first coupler means for to-and-fro swinging movement;



a second eccentric pin, having a fourth axis, radially offset from said first, second and third axes, coupled to said first eccentric drive pin for bodily movement therewith; and

connector means coupling said second eccentric drive pin to said rocker arm means to swing said rocker arm in said to-and-fro path;

said coupler means coupled to said ejector means and to said rocker arm means for reciprocally moving said ejector means relative to said trim die to separate severed articles at said trim station from said one trim die.

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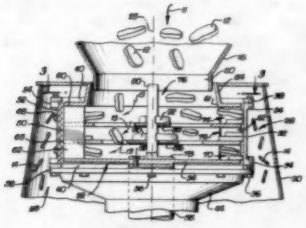
**4,391,172**

## ROTARY CUTTING MACHINE

**Lesley A. Galland, and Bruce W. Skiver, both of Caldwell, Id., assignors to J. R. Simplot Company, Boise, Id.**

**Filed Mar. 24, 1981, Ser. No. 246,926**
**Int. Cl.³ B26D *3/28***
**U.S. Cl. 83—403** **30 Claims**



1. A rotary cutting machine for cutting a product into a plurality of pieces, comprising:

a generally cylindrical housing having a plurality of circumferentially spaced, axially open slots formed therein;

a plurality of cutting knives each including an axially extending cutting edge at one side of a respective one of said slots, said cutting edges being presented in a common circumferential direction; and

a generally cylindrical impeller mounted for rotation within said housing, said impeller including a base plate closing one axial end thereof, an annular cover plate at the opposite axial end defining a central opening for admission of a flow of the product into the impeller, means cooperating with said base plate and said cover plate to form a plurality of axially separated and radially open passages, said passages forming means including at least one annular divider plate disposed axially between said base and cover plates and generally in parallel therewith, and a plurality of circumferentially spaced axially extending paddles connected to said base, cover, and divider plates near their peripheries for securing said base, cover, and divider plates with respect to each other and for rotationally carrying the product flowing through said passages into cutting engagement with said cutting knives, and means for directing the flow of the product upon rotation of the impeller in a radially outward direction for flow in substantially equal portions through said passages into cutting engagement with said cutting knives.

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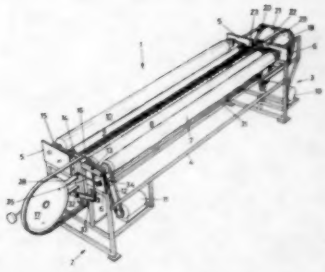
**4,391,173**

## SHEARING CRADLE

**Colin C. Anderson, 6 Montrose Pl., Beaumont, South Australia, Australia**

**Continuation of Ser. No. 108,164, Dec. 28, 1979, abandoned.**
**This application Nov. 24, 1981, Ser. No. 324,449**
**Claims priority, application Australia, Jan. 2, 1979, PD7250**
**Int. Cl.³ B26D *7/06***
**U.S. Cl. 83—424** **6 Claims**



1. Apparatus for shearing sheep, said apparatus comprising a frame supporting a plurality of propelled parallel rollers extending longitudinally of the frame to support a sheep in a reclining position, an endless belt cutter positioned between an adjacent pair of said rollers, said rollers being positioned to have central and outermost rollers with the central rollers lower than the outermost rollers to allow the sheep to lie on the rollers, said cutter means being characterized by said endless belt cutter having a course extending axially of said rollers intermediate said central rollers, and means to drive the rollers to move the sheep through an arc to present the unshorn wool to the endless belt cutter.

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**4,391,174**

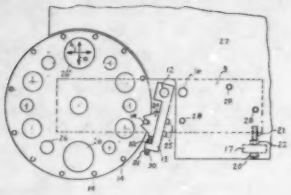
## PUNCH PRESS MACHINE WITH ADJUSTABLE TOOL POSITIONING

**Gerard G. F. Smeets, 50 Inverlochy Blvd., Apt. 102, Thornhill, Ontario, Canada**

**Filed Sep. 5, 1979, Ser. No. 72,668**
**Claims priority, application Canada, Aug. 30, 1978, 310359**
**Int. Cl.³ B21D *28/26*; B26F *1/04***
**U.S. Cl. 83—552** **8 Claims**

1. In a turret type punch press machine, adjustable means for aligning tool elements of spaced rotors comprising, a supporting member for at least one of the rotors, the supporting member being pivottably connected to a main frame of the machine, adjustable positioning and locking means for providing limited

vernier adjustment of said supporting member about its pivot point on the machine, an indexing mechanism mounted on the supporting member providing for multi-position indexing of the rotor about its axis, and wherein the indexing mechanism is adjustable to provide limited angular positioning of the rotor



for each indexed position thereof and to provide, in conjunction with the adjustable positioning of the supporting member two limited and substantial orthogonal directions of adjustment of the position of a tool mounted in the rotor on the supporting member.

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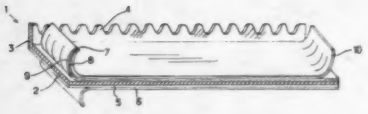
**4,391,175**

## PERFORATING DEVICE ESPECIALLY ADAPTED FOR USE WITH PRINTING MACHINES

**Steve Christian, 43, rue Rodin, 93290 Tremblay-les-Gonesse, France**

**Filed Mar. 26, 1981, Ser. No. 247,996**
**Claims priority, application France, Mar. 27, 1980, 80 06862**
**Int. Cl.³ B26D *3/00***
**U.S. Cl. 83—678** **3 Claims**



1. Perforating device or similar means, especially adapted for use with printing machines such as offset machines which comprises:

(a) a rigid, thin metallic plate in the form of a strip, which presents, in protrusion, on one of its two faces, at least one cutting or perforating element;

(b) a layer of adhesive material applied upon the side of thin metal plate opposite said cutting or perforating element, said adhesive layer capable of being protected by a protective strip which is removed at the moment of use; and

(c) a double faced self-adhesive tape adhering upon one of its faces, upon the side of said thin metal plate adjacent to said cutting or perforating element, the other face of the double faced self-adhesive tape capable of being protected by a protective strip which is removed at the moment of use.

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**4,391,176**

## ELECTRONIC MUSICAL INSTRUMENT WITH MUSICAL COMPOSITION FASHION SELECTORS

**Naoyuki Niinomi, and Kunihiko Watanabe, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 29, 1980, Ser. No. 182,575**
**Claims priority, application Japan, Sep. 8, 1979, 54-115400**
**Int. Cl.³ G10H *1/12, 1/38, 1/46***
**U.S. Cl. 84—1.17** **18 Claims**

1. An electronic musical instrument comprising:

a first keyboard having a plurality of keys for performing a melody;

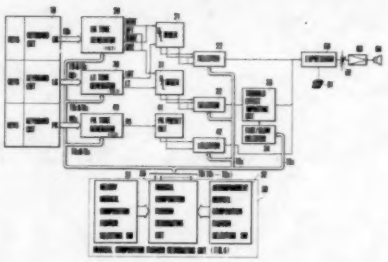
a second keyboard having a plurality of keys for performing an accompaniment;

a melody tone generator generating a melody tone in response to depression of a key of said melody performance keyboard;

an accompaniment tone generator generating an accompaniment tone in response to depression of a key of said accompaniment performance keyboard;

a plurality of melody musical composition fashion selection switches connected to a like plurality of first logic circuit means for designating a single one of a musical composition fashion of a melody tone to be produced from among a plurality of predetermined kinds of musical composition fashions for melody;

a plurality of accompaniment musical composition fashion selection switches connected to a like plurality of second logic circuit means for designating a single one of a musical composition fashion of an accompaniment tone to be produced from among a plurality of predetermined kinds of musical composition fashions for accompaniment;



said second logic circuit means being connected to said first logic circuit means such that the musical composition fashion of an accompaniment tone is selected in correspondence with the selected musical composition fashion of a melody tone when none of said plurality of accompaniment musical composition fashion selection switches are operated, and such that the musical composition fashion of a melody tone is selected in correspondence with the selected musical composition fashion of an accompaniment tone when none of said plurality of melody musical composition fashion selection switches are operated;

a modifying parameter generator which generates a modifying parameter corresponding to an operated one of said musical composition fashion selection switches;

modifying means for modifying outputs of said melody and accompaniment tone generators in accordance with said modifying parameter generated from said modifying parameter generator; and

means for producing a musical tone signal in accordance with said output of said modifying means.

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**4,391,177**

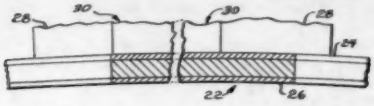
## PIANO SOUNDBOARD AND METHOD OF MAKING SAME

**Stanley A. Grajek, DeKalb, Ill.; Robert S. Hill, Holly Springs, Miss., and George S. Klaiber, Tonawanda, N.Y., assignors to The Wurlitzer Company, DeKalb, Ill.**

**Division of Ser. No. 234,360, Feb. 13, 1981, Pat. No. 4,361,458.**
**This application Jun. 21, 1982, Ser. No. 390,293**
**Int. Cl.³ G10C *3/06***
**U.S. Cl. 84—196** **8 Claims**

1. A soundboard for a piano comprising: three plies of wood bonded together, the front and back plies being of substantially equal thickness and the center ply being of a thickness greater than the sum of the thicknesses of the front and back plies, the center ply comprising a plurality of elongate boards each having a preselected curvature from side-to-side and bonded

together edge-to-edge with the curvature of each board in the same direction to form a composite board having a substantially continuous curvature, concave on one side and convex on the other side, whereby the assembled, three-ply soundboard has a curvature imparted thereto by the center ply.

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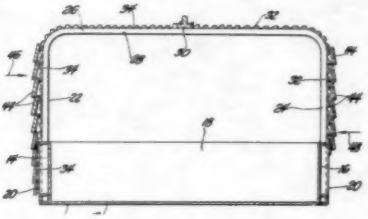
**4,391,178**

## LOGISTIC VEHICLE ARMOR

**Victor H. Pagano, Oakland, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Mar. 13, 1981, Ser. No. 243,287**
**Int. Cl.³ F41H 7/00**
**U.S. Cl. 89—36 H** **1 Claim**



1. In a military vehicle that includes a cargo box having side walls (14 and 16): the improvement comprising an inverted U-frame structure having a number of elevated bow roof sections (28) and downwardly extending leg sections (22 and 24) connected to the box side walls; a central ridge pole (30) extending between and normal to the bow roof sections on the longitudinal axis of the cargo box; two fabric covers (32 and 34) extending horizontally in opposite directions from the central ride pole and thence downwardly along the aforementioned leg sections at least to the upper edges of the cargo box side walls; means defining a number of horizontal hollow fabric sleeves on the downwardly extending portions of the fabric covers; each of the individual fabric sleeves being the same length in the horizontal direction as the associated cover; said fabric sleeves being open at their ends for enabling ballistic armor slats to be inserted into said sleeves; adjacent sleeves being overlapped on one another and being sufficient in number so that the sleeves collectively occupy the entire downwardly extending portion of each fabric cover; an elongated ballistic armor slat (44) insertable lengthwise into each fabric sleeve to provide ballistic protection for personnel occupying the cargo box; the fabric sleeves for each cover being formed from a single length of fabric material that is periodically doubled back on itself, each doubled back area being stitched to the fabric cover whereby the zones between adjacent stitched areas define the fabric sleeves; the individual armor slats having flat parallel faces and interconnecting longitudinal edges, opposite edges on individual slats being beveled so that edges on adjacent slats overlap one another when the slats occupy a given plane within the fabric sleeves; said armor slats being removable from the fabric sleeves, said covers being capable of being rolled up to a non-use storage position adjacent to the ridge pole when the slats are removed from the sleeves.

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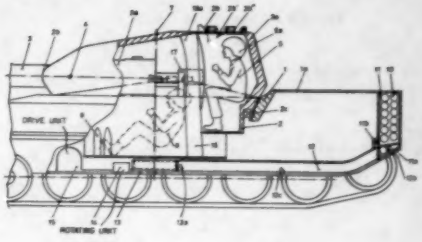
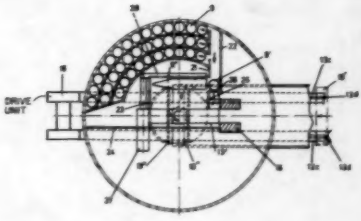
**4,391,179**

## COMBAT VEHICLE

**Erling Tidström, Karlskoga, Sweden, assignor to Aktiebolaget Bofors, Bofors, Sweden**

**Filed May 1, 1980, Ser. No. 145,635**
**Claims priority, application Sweden, May 14, 1979, 7904188**
**Int. Cl.³ F41H 7/06**
**U.S. Cl. 89—46** **6 Claims**




1. A track driven combat vehicle comprising:

a track driven mechanism supporting a lower chassis for movement in a longitudinal direction,

said lower chassis including at a rear portion thereof a magazine for holding explosive ammunition units,

a conveyor for receiving ammunition units from said magazine and delivering said ammunition units to a forward position along said chassis to a rotary table for rotating said ammunition units;

a turret mechanism centrally located for rotation about said chassis including a front portion narrower in width than in length for presenting a minimum target area;

said front portion including a breech loading firearm, and a rear portion of said turret including a compartment for supporting a crew member, a turret magazine located above said rotary table;

means for positioning a vertically oriented projectile in said turret magazine to a lateral position;

a hoist car vertically supported for movement in a vertically extending frame from a position for receiving an ammunition unit from said table, and a projectile in said lateral position, to a breech loading position of said firearm, whereby the vulnerability of a hit to said vehicle is minimized by maintaining the bulk of explosive ammunition units at the rear of said vehicle, and the probability of a hit to said turret is minimized by said front portion presenting a minimum target area.

## 4,391,180
## METHOD AND MEANS FOR CONTROLLING THE FIRING RATE FROM A MACHINE GUN

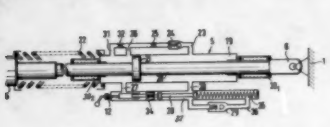
**Richard Koine, Ratingen, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 147,291, May 6, 1980, abandoned, which is a continuation of Ser. No. 864,237, Dec. 27, 1977, abandoned. This application Jul. 14, 1980, Ser. No. 168,331**

**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1976, 2658770**

**Int. Cl.³ F41D *11/00***

**U.S. Cl. 89—129 R** **5 Claims**



1. An improved arrangement for controlling the rate of firing of fire bursts in a machine gun having a breech block, an ammunition feed device and a recoil and counter-recoil device for elastically coupling the gun to gun mount by means of a differential recoil system so as to enable the gun to oscillate with preselected oscillation characteristics during firing said gun emitting energy impulses during firing of a shell which are operatively conducted by conduit means to produce ignition of the following shell fed into the gun by the ammunition feed device, the improvement comprising:

receiving means and storing means operatively mounted in said recoil and counter-recoil device said storing means being adapted to store the recoil energy of the gun during recoil thereof, control means operatively connected to said storing and receiving means, said control means having a timing element and being adapted to selectively release a predetermined amount of energy for the counter-recoil motion;

adjusting means operatively connected to said control means for adjusting said timing element;

a primary transmitter operatively associated with said breech block to emit a first signal at a preselected position of said breech block;

a secondary transmitter operatively associated with said recoil and counter-recoil device for emitting a second signal at a preselected position of said recoil and counter-recoil device; and

a relay in said conduit means adapted to conduct an energy pulse emitted from the gun during firing of a shell to initiate ignition of the following shell in the breech block when said first and second signals have placed said relay in a conductive state;

said primary and secondary energy transmitters being operatively coupled to said conduit means.

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## 4,391,181
## HYDRAULIC CONTROL SYSTEMS FOR MINING APPARATUS

**Walter Weirich, Dortmund; Michael Dettmers, Kamen; Kunibert Becker, Werl, and Harry Rosenberg, Lüdinghausen, all of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lunen, Fed. Rep. of Germany**

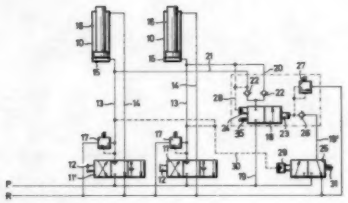
**Continuation of Ser. No. 948,458, Oct. 4, 1978, abandoned. This application Nov. 17, 1980, Ser. No. 207,507**

**Claims priority, application Fed. Rep. of Germany, Nov. 4, 1977, 2749312**

**Int. Cl.³ F15B *13/04***

**U.S. Cl. 91—29** **4 Claims**

1. In a hydraulic control system for controlling the operation of pressure-fluid operated support props of mining apparatus; said system comprising a common pressure fluid feed line (P), a common pressure fluid return line (R) and manually operated control devices (11, 11') for selectively connecting the feed and return lines to respective first (15) and second (16) working chambers of associated props (10) of which a first working chamber (15) serves to extend and set the prop when connected to the pressure line; the improvement comprising setting valve means (18) with opposed first (24) and second (23) pressure-fluid operated control pistons, the setting valve means being settable with the first piston (24) into a first state where connection between the pressure line and said first working chamber (15) is blocked and settable with the second piston (23) into a second state where connection between the pressure line and said first working chamber is established independently of the operating position of the manually operated control devices (11, 11') the first control piston (24) of the setting valve means being connected to said first working chamber (15) and biased with spring force (35) into the first state; and control valve means (25) provided with a control piston (29) connected to said first working chamber (15) and biased with opposed spring force (31) to block the pressure line



(P) from the second piston (23) of the setting valve means (18) unless a predetermined threshold pressure level prevails in said first working chamber (15) and to connect said second piston (23) of the setting valve means (18) to the pressure line (P) when said predetermined threshold pressure is exceeded in said first working chamber (15); whereby the control valve means (25) causes the setting valve means (18) to change from its first state to its second state to connect the first working chamber (15) to the pressure line (8) after an associated control device (11, 11') has connected the pressure line (P) to said first working chamber (15) and the threshold pressure level thereafter is exceeded so that connection between said first working chamber (15) and said pressure line (P) is maintained independent of the operating position of said associated control device, and whereby the setting valve means (18) thereafter reverts to its first state under the action of the first control piston (24) thereof once the pressure in the first working chamber (15) reaches a level in excess of the threshold level and signifying that prop setting has occurred.

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## 4,391,182
## FLUID ACTUATED POSITIONER

**Jacob Kobelt, 6110 Oak St., Vancouver, British Columbia, Canada (V6M 2W2)**

**Filed Jul. 29, 1980, Ser. No. 173,279**

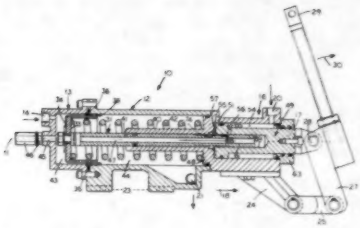
**Int. Cl.³ F15B *9/10, 15/17***

**U.S. Cl. 91—378** **10 Claims**

1. A fluid actuated positioner adapted to receive a working fluid of constant pressure and to produce a mechanical output signal proportional to a fluid input signal from a signal fluid of varying pressure, the positioner having:

(a) an input cylinder having input partition means dividing the cylinder into first and second input chambers, an input rod mounting the partition means for movement axially of the cylinder, the first input chamber receiving the signal fluid under varying pressure which generates a varying input signal on the input rod, and resilient means cooperating with the input rod to oppose the input signal on the input rod, the input rod being essentially unaffected by contact with the working fluid,

(b) an output cylinder having an output member with an output partition means and an output rod, the output partition means dividing the output cylinder into first and second output chambers, the output partition means having first and second faces within the respective output chambers, the output rod mounting the output partition means for movement axially of the output cylinder, the first output chamber receiving the working fluid under a constant pressure which generates a first force on the output partition means, the output rod extending from the output partition means through the first output chamber so that the first face has a smaller effective area than the



second face, and a fixed metering means disposed between exhaust and the second output chamber to control flow of working fluid therefrom prior to exhausting the working fluid,

(c) a main control valve communicating with the first and second output chambers and having first and second valve portions, the first valve portion being a connecting bore within the output member, the connecting bore communicating with the first output chamber, and the second valve portion being a portion of the input rod which cooperates with the connecting bore to control fluid flow therethrough, so that relative positions of the output member and the input rod control metering of a continuous flow of working fluid passing between the first and second valve portions so as to control flow of working fluid from the first output chamber into the second output chamber prior to exhausting the working fluid from the positioner,

so that the working fluid in the second output chamber generates a second force on the second face in opposition to the first force to produce on the output rod a resultant displacement proportional to the input signal.

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**4,391,183**

## HYDRAULIC BLOCKING VALVE

**Stig Broms, Täby, and Lennart Freese, Järfälla, both of Sweden, assignors to Innovation Aktiebolag, Sundbyberg, Sweden**

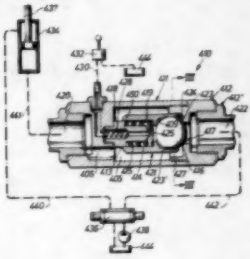
**Filed Feb. 14, 1980, Ser. No. 121,619**

**Claims priority, application Sweden, Feb. 22, 1979, 7809012**

**Int. Cl.³ F15B *13/042*; F16K *31/122***

**U.S. Cl. 91—461** **4 Claims**

1. In a hydraulic blocking or holding valve including a valve housing having a hollow interior with an inlet and an outlet and a valve body shiftable to close a main valve seat for interrupting the communication between the inlet and outlet and alternately to open said main valve seat for permitting said communication, the valve body being arranged between two chambers in said housing interior, namely one inlet chamber in communication with the inlet and located between the valve body and the valve seat, and one operating chamber located on the opposite side of the valve body from the valve seat, a throttling or constricting passage via which the inlet chamber and the operating chamber are in communication with each other for counteracting flow of hydraulic liquid between the chambers, and control valve means in normally unconstricted communication with the operating chamber and actuable for lowering the pressure in the operating chamber in relation to the pressure in the inlet chamber to thereby create a pressure difference between the two chambers causing the valve body to shift to an open position opening said main valve seat, wherein the improvement comprises a constriction means responsive to said shifting of said valve body to its open position for constricting but not stopping the outflow of hydraulic liquid from the operating chamber to said valve means, said valve body being a ball received in a movable sleeve communicating with said inlet chamber, said housing including a fixed internal spigot protruding into the housing interior and separated from said main valve seat by said ball, spring means backed with respect to said housing for urging said ball against said valve seat and away from said spigot, said sleeve being slidable over said spigot and defining with the spigot said operating chamber, a sliding gap between said sleeve and spigot forming said throttling passage between the inlet chamber and operating chamber, an orifice in said spigot providing said normally unconstricted communication of said operating chamber with said valve means, said orifice being located in said operating chamber to face said ball, said spring means being dimensioned for causing said ball, in response to said shifting of said ball and sleeve away from said main valve seat by said pressure difference, to assume an almost abutting relation with said spigot at said orifice forming said constriction means therebetween, for simultaneously constricting outflow into the orifice and maintaining the constricted outflow of hydraulic liquid from the operating chamber through the orifice to the open valve means.



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**4,391,184**

## DIAPHRAGM ACTUATOR

**Ken Yamane, Yokohama, Japan, and Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Sep. 30, 1980, Ser. No. 192,164**

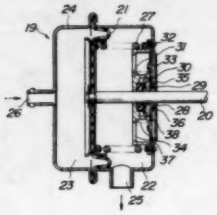
**Claims priority, application Japan, Oct. 6, 1979, 54-137938; Oct. 16, 1979, 54-132445**

**Int. Cl.³ F16J *15/16***

**U.S. Cl. 92—100** **2 Claims**

1. A diaphragm actuator comprising a pressure chamber supplied with positive or negative pressure, a negative pressure chamber supplied with negative pressure, a diaphragm defining said pressure chamber and said negative pressure chamber, an operating shaft extending through a wall portion of the negative pressure chamber and connected at one end with the diaphragm, said diaphragm causing the operating shaft to axially slide, relative to said wall portion, in response to the pressure difference between the positive or negative pressure in said pressure chamber, and the negative pressure in said

negative pressure chamber, wherein said wall portion is provided with a sealing arrangement which includes a sealing diaphragm mounted on said wall portion and having an axially movable inner peripheral portion surrounding the operating shaft, a movable annular member supported by the inner peripheral portion of the sealing diaphragm, a stationary annular member secured to the wall portion in the negative pressure



chamber and opposing to the movable annular member, and a resilient O-ring inserted between said annular members and slidably receiving the operating shaft, at least one of the opposite surfaces of said annular members being tapered such that the O-ring is compressed by said opposite surfaces axially and radially inwardly as the negative pressure in the negative pressure chamber exceeds a predetermined value.

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**4,391,185**

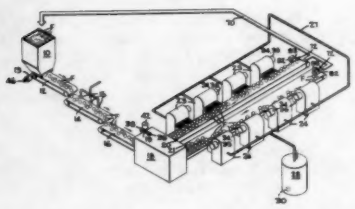
**SYSTEM FOR CONTROLLING A JUICE EXTRACTION FACILITY**

**Robert C. Stanley, Lakeland, Fla., assignor to FMC Corporation, Chicago, Ill.**

**Division of Ser. No. 171,917, Jul. 24, 1980, Pat. No. 4,335,145. This application Mar. 10, 1982, Ser. No. 356,671**

**Int. Cl.³ A23N *1/00*; B02C *25/00*; B23Q *15/00*; G01N *33/14***

**U.S. Cl. 99—489** **2 Claims**



1. A system for controlling the flow of fruit and fruit juice through a juice extraction facility, said juice extraction facility including a fruit storage location for storing the fruit in bulk, a sizer for separating the fruit into at least two size categories, said sizer being adjustable to vary the size limits of each category, a feeder for feeding the fruit from the fruit storage location to the sizer, said feeder powered by a motor, a plurality of juice extractors, each of said extractors powered by a motor and said extractors being arranged in two or more groups with each group of extractors adapted to extract juice from fruit in one of said size categories, means for conveying the fruit from the sizer to the extractors according to size, means for recycling unused fruit from each group of extractors to a location upstream of said group, and a juice storage location adapted to receive juice collected from all extractors, said system comprising:

a central processing unit adapted to receive signals from sensors located at various remote locations, process said signals, and transmit control signals to various remote final control devices, said control signals calculated according to predetermined algorithms;

means associated with each group of extractors for counting the number of fruit recycled from that group and for transmitting a signal indicative of said number of fruit to the central processing unit;

sensing means mounted at the juice storage location for measuring the amount of juice therein and for transmitting a signal indicative of said amount to the central processing unit;

a sizer motor adapted to receive a control signal from the central processing unit and to vary the limits of each size category accordingly;

a plurality of motor control centers, each of said centers associated with one extractor, adapted to start and stop the associated extractor motors in accordance with signals received from the central processing unit; and

a motor speed control unit associated with the feeder motor and adapted to vary the feed rate of fruit to the extractors in accordance with a signal received from the central processing unit;

said control signals to the sizer motor, to the motor control centers, and to the motor speed control unit calculated to maintain a preselected amount of juice at the juice storage facility, to equalize the number of fruit recycled from each group of extractors, and to minimize the total number of fruit recycled.

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**4,391,186**

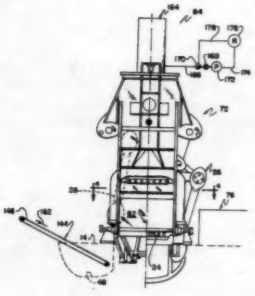
**COTTON PRESS**

**William R. Davis, P.O. Box 131, Charleston, Mo. 63834**

**Filed Nov. 17, 1980, Ser. No. 207,629**

**Int. Cl.³ B65B *13/18***

**U.S. Cl. 100—7** **18 Claims**



1. A cotton press adapted to receive a debanded bale for compressing the same to a configuration to receive bands therearound, the press being of the Webb type incorporating a frame having a pair of aligned spaced inverted U-shaped members; a movable platen mounted for upward movement toward a stationary platen; and means for forcing the movable platen upwardly toward the stationary platen including a vertically mounted piston-cylinder arrangement and a linkage mechanism interconnecting the piston-cylinder arrangement and the movable platen, the linkage mechanism comprising first and second pairs of links on opposite ends of the U-shaped members, each of the links being generally aligned with one of the U-shaped members, the improvement comprising

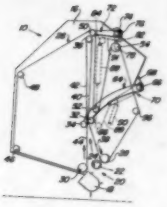
means providing cotton movement through the press in a path between the spaced inverted U-shaped members including means for feeding a debanded cotton bale between the links of the first link pair toward a pressing location between the platens and for moving a banded cotton bale between the links of the second link pair away from the pressing location.

4,391,187

## BELT-TENSIONING SYSTEM FOR ROUND BALERS

Richard W. Koning; Gerald F. Meiers, and Henry D. Anstey, all of Ottumwa, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Oct. 5, 1981, Ser. No. 308,223
Int. Cl.³ B30B 5/06; A01D 39/00
U.S. Cl. 100—88 10 Claims



1. A round baler having a main frame and including an endless belt and roll system providing first and second oppositely moving belt stretches to at least partly define a bale chamber, said system further including means for holding the stretches apart to define a crop inlet, first and second rolls spaced above the inlet and closely spaced apart to substantially close the upper part of the chamber and carrier means journalling the first and second rolls and mounted on the main frame for upward movement as the bale chamber grows and belt-tensioning mechanism characterized in that the belt-tensioning mechanism includes a third roll spaced above the first and second rolls and supporting a third belt stretch, means mounting the third roll on the main frame for movement toward and away from the carrier means, and means interconnecting the carrier means and the third roll mounting means for causing the third roll to move upwardly as the carrier means moves upwardly.

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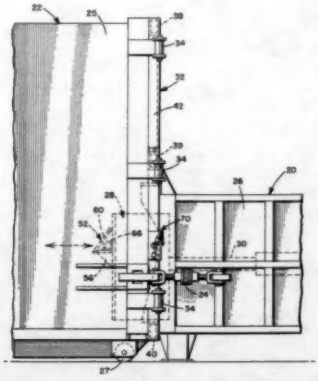
4,391,188

## PIN-OFF AND DOOR CLOSURE ASSEMBLY FOR A STATIONARY REFUSE COMPACTOR

Kenneth W. Gwathney, Vernon; David L. Gann, Guin; Steven G. Seagraves, Sr., Millport, all of Ala.; Gary R. Fenner, Greenville, and Gordon H. Fenner, Columbus, both of Miss., assignors to Marathon Equipment Company, Vernon, Ala.

Filed Feb. 3, 1981, Ser. No. 231,021
Int. Cl.³ B30B 15/06
U.S. Cl. 100—229 A 20 Claims



8. In combination with a stationary refuse compactor assembly including a refuse container having a load opening, and a packer unit having a reciprocating ram detachably engaged with said container for forcing refuse through the load opening into the refuse container, a pin-off assembly for positioning across the load opening of the refuse container, said pin-off assembly including

(a) an elongated member adapted to be positioned across the load opening, the ends of said elongated member being provided with pin-receiving recesses

(b) said refuse container being provided with opposed openings adjacent the load opening

(c) pin support means carried by said container and aligned with the opposed openings adjacent the load opening

(d) retaining pins positioned in said pin support means and inserted through the opposed openings of the refuse container into the pin-receiving recesses in said elongated member

(e) said retaining pins being removable to withdraw said elongated member from the load opening, and

(f) stop means for limiting the extent of entry of each of said retaining pins into the pin-receiving recesses of said elongated member.

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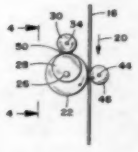
4,391,189

## CODE DATER FOR TRAY FORMING APPARATUS

David Anenson, River Falls, Wis., assignor to Champion International Corporation, Stamford, Conn.

Continuation of Ser. No. 85,788, Oct. 17, 1979, abandoned. This application Mar. 23, 1981, Ser. No. 246,150
Int. Cl.³ B41F 17/22
U.S. Cl. 101—36 2 Claims



1. A code dater for coding tray blanks being formed into trays in a tray forming machine comprising:

(a) means attached to said machine for maintaining each of said tray blanks in a semi-rigid condition as said blanks move through said machine, said means including a drive wheel mounted on a driven shaft, said drive wheel being rotated in one direction only, said drive wheel being disposed in contact with one side of said blanks thereby aiding in drawing said blanks through said tray forming machine, said means further including a freely rotatable idler wheel disposed on the opposite side of said tray blanks and aligned with said drive wheel, said means further including a pair of side plates for supporting the opposed ends of said tray blanks as they pass through said machine, said drive and idler wheels cooperating with said plates to deform said tray blank into a bow-like configuration to maintain said tray blanks in a semi-rigid condition, said drive and idler wheels being in contact with said blanks at approximately the apex of said bow-like configuration; and

(b) means for printing coded information on said blanks as they are maintained in said semi-rigid condition, said means including a circular code dater wheel having a printing font located on the periphery thereof, said wheel being eccentrically mounted at a point spaced from its center on said driven shaft, such that the portion of the periphery of said code dater wheel having said printing font thereon comes into contact with one side of said blanks one time for each revolution of said driven shaft, and with said code dater wheel being mounted in close

proximity to and adjacent, said drive wheel, whereby said printing font thereon contacts with tray blanks at a point on said blanks which is maintained in said semi-rigid condition by said drive and idler wheels, in close proximity to and adjacent the apex of said bow-like configuration, and said machine being devoid of any support means for said coder dater wheel on said opposite side of said tray blanks whereby the semi-rigid condition and bow-like configuration of said blanks comprising the sole support surface for said code dater wheel.

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4,391,190

## PRE-SETTING OF PRINTING MACHINES

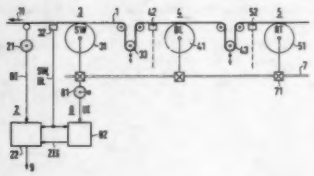
Hans-Georg Metzler, Höchstadt, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jul. 23, 1980, Ser. No. 171,368

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1979, 2930438

Int. Cl.³ B41M *1/14;* B41F *5/16;* B65H *23/04*

U.S. Cl. 101—211 13 Claims



8. In a printing machine including a plurality of printing stations each having at least one printing cylinder which can be activated for printing independently of printing cylinders of other stations, means for determining the angular offset of the printing cylinders of an upstream and a downstream printing station comprising means disposed at a predetermined location on each of the cylinders of the upstream and downstream printing stations for printing a reference mark on web or sheet material moved past the cylinders, optical scanning means disposed downstream of the printing cylinder of the downstream station for detecting reference marks printed by the two cylinders and providing respective output signals in response thereto, first transducer means having an output signal proportional to the length of material moved past the first transducer means, second transducer means having an output signal proportional to the angular rotation of a respective cylinder, first means coupled to receive the output signals of the scanning means and the second transducer means and in response thereto determining the relative angular position of the predetermined location of the downstream printing cylinder when a reference mark printed by the downstream printing cylinder is detected and for providing an output signal each time the predetermined location of the upstream printing cylinder rotates past an angular position corresponding to the relative angular position of the predetermined location of the downstream printing cylinder when the reference mark printed by the downstream printing cylinder was detected and second means coupled to receive the output signals of the first transducer means, the scanning means and the first means and providing a signal proportional to the distance travelled by the material between an output signal of the first means when the printing cylinder of the downstream printing station is not printing and when the printing cylinder of the upstream printing station is printing and the next reference mark printed by the printing cylinder of the upstream printing station detected by the optical scanning means.

4,391,191

## RECIPROCAL SUPPORTING ARRANGEMENT FOR CONTACTING CYLINDERS OF A PRINTING UNIT

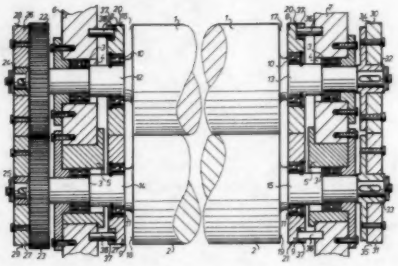
Hans-Bernhard Bolza-Schunemann, Wurzburg, Fed. Rep. of Germany, assignor to Koenig & Bauer AG, Wurzburg, Fed. Rep. of Germany

Continuation of Ser. No. 94,540, Nov. 15, 1979, abandoned. This application Aug. 3, 1981, Ser. No. 289,651

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1979, 2926570

Int. Cl.³ B41F *13/20*

U.S. Cl. 101—216 4 Claims



1. An arrangement for the precise support and rotation of first and second cylinders which contact each other in a printing unit of a rotary printing press, the cylinders being carried on shafts which rotate in journals that are carried in spaced side frames, the cylinders being positioned between the spaced side frames, said support arrangement comprising:

spaced pairs of non-rotating support rings carried by the shafts of the first and second cylinders, said support rings on the first cylinder shaft contacting said support rings on the second cylinder shaft to produce an initial stress force between said pairs of support rings to maintain the cylinders spaced an exact distance from each other and to maintain journal deflections constant, said support rings being positioned adjacent planar ends of the cylinders interiorly of the side frames, and being constrained from rotation with the shafts;

at least a first pair of contacting rotatable cylinder rings, one of said rotatable cylinder rings being secured to the shaft of the first cylinder for rotation therewith, and another of said rotatable cylinder rings being secured to the shaft of the second cylinder for rotation therewith, said rotatable cylinder rings being sized to provide a selected peripheral contact force between said cylinder rings to ensure a precise rolling drive for the cylinders and to dampen vibrations, said cylinder rings contacting each other exteriorly of the side frames; and,

drive means to rotate the first and second cylinders.

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4,391,192

## BEARING ARRANGEMENT FOR AN INK FOUNTAIN IN A ROTARY PRINTING MACHINE

Erich G. Wieland, Würzburg, Fed. Rep. of Germany, assignor to Koenig & Bauer AG, Wurzburg, Fed. Rep. of Germany

Filed Sep. 10, 1981, Ser. No. 300,850

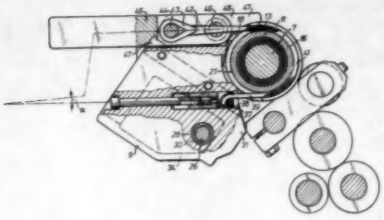
Claims priority, application Fed. Rep. of Germany, Sep. 10, 1980, 3033998

Int. Cl.³ B41F *31/06;* B41L *27/08*

U.S. Cl. 101—350 8 Claims

1. A bearing arrangement for a pivotable ink fountain in a rotary printing machine having a driven ink fountain roller plunging into said ink fountain, wherein a supporting ring is supported on either side of said fountain roller on a roller journal, each of said supporting rings carrying a securement

means which wraps on a periphery of said supporting ring, a first end of said securement means being secured to said ink fountain, a second end of said securement means being connected to a tensioning device which is secured to said ink fountain so that said ink fountain is capable of being pivoted off said ink fountain roller.



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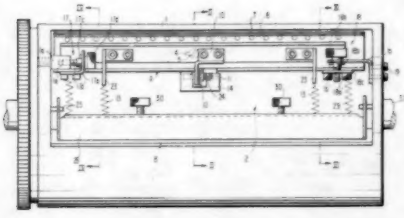
4,391,193

**PLATE HOLDING DEVICE FOR OFFSET DUPLICATOR**

Koji Ishii; Takahiko Shinmoto, both of Fuchu, and Kenso Mahara, Hiroshima, all of Japan, assignors to Ryobi Ltd., Hiroshima, Japan

Filed Apr. 6, 1981, Ser. No. 251,450
Claims priority, application Japan, Apr. 17, 1980, 55-52663
Int. Cl.³ B41F *27/00*
U.S. Cl. 101—415.1 9 Claims



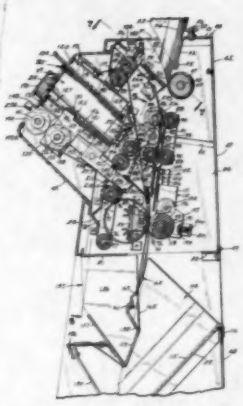
1. A printing plate holding device for an offset duplicator, said holding device being positioned in a grooved portion of a plate cylinder and confronting a tail clamp device, said holding device comprising: a base positioned along one side of said grooved portion and slidably secured thereto in a horizontal plane; a clamp plate pivotally secured to said base and provided with a first pin; a clamp lever fixed to said clamp plate and provided with a second pin; a latch loosely secured to said second pin of said clamp lever and connected to a spring so as to provide a plate clamping force to said clamp plate, said latch being engageable with a bracket of said base so as to maintain said clamp plate at an open position; a guide plate and a plate release preventing plate both fixed to an outer longitudinal side of said base; axial displacement control means positioned at one longitudinal end of said cylinder; circumferential displacement control means positioned at the other longitudinal end of said cylinder; said axial displacement control means comprising a first knob rotatably extending through a slot formed in a first bracket fixed to said base, said first knob being threadingly engaged with said plate cylinder; and said circumferential displacement control means comprising a second knob rotatably extending through a slot formed in a second bracket fixed to said cylinder, said second knob being threadingly engaged with a third bracket fixed to said base.

4,391,194

**METHOD FOR ADDRESSING CARDS AND ENVELOPES**

Ronald A. Rogers, Apple Valley; Ansel J. Wright, Minneapolis, and William H. Wright, Hopkins, all of Minn., assignors to Master Addresser Company, Minneapolis, Minn.

Continuation of Ser. No. 97,377, Nov. 21, 1979, abandoned, which is a division of Ser. No. 854,611, Nov. 25, 1977, Pat. No. 4,186,659. This application Apr. 30, 1981, Ser. No. 259,181
Int. Cl.³ B41M *5/00*
U.S. Cl. 101—471 18 Claims



1. A method of reproducing material imprinted on a master element having indicia of heat conducting material thereon, comprising:

(a) feeding the master element through a printing zone in which a heating element is disposed;

(b) feeding a print receiving member through the printing zone outwardly of the master element relative to the heating element and in the same direction as the master element;

(c) supporting a length of flexible sheet material provided with a heat transferable printing medium under predetermined tension between the master element and the print receiving member;

(d) intermittently advancing a predetermined length of the flexible sheet material through the printing zone against its supporting tension in the same direction as the master element;

(e) and pressing the master element, flexible sheet material and printing receiving membe[illegible]gether during movement thereof through the printing zone.

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4,391,195

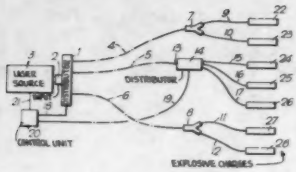
**DETONATION OF EXPLOSIVE CHARGES AND EQUIPMENT THEREFOR**

Peter C. Shann, 4, Orchard Way, Dringhouses, York, England

Filed Aug. 18, 1980, Ser. No. 179,153
Claims priority, application United Kingdom, Aug. 21, 1979, 7929128; Aug. 21, 1979, 7929129; Oct. 20, 1979, 7936504
Int. Cl.³ F42B *3/10*
U.S. Cl. 102—201 36 Claims

1. A system for connecting a set of explosive charges with a laser for detonation by optical energy from the laser which comprises an input for optical energy produced by the laser, a set of optical fibres for connection one with each of the charges and distributor means for distributing optical energy from the input to the fibres of said set, said fibres having longitudinal axes and said distributor means being operable to receive energy from the laser and to direct a part of the received energy into the fibres and to direct the remainder of the received

energy to waste, at least a substantial proportion of the part directed into the fibres being directed non-axially so that the




propagation of said at least a substantial proportion through the fibres is by zigzag paths.

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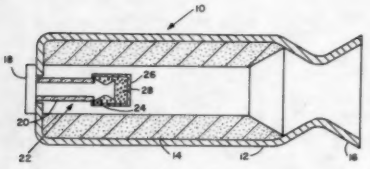
**4,391,196**

**ADD-ON IGNITER FOR PYROGEN TYPE IGNITER**

**Robert E. Betts, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Apr. 20, 1981, Ser. No. 255,906**
**Int. Cl.³ F02K 9/95**
**U.S. Cl. 102—202** **2 Claims**




1. In a solid propellant rocket motor having a solid propellant perforated grain contained in a case, an exhaust nozzle at the aft end of said case and a pyrogen igniter at the forward end of said case, said pyrogen igniter including:

(i) an exhaust nozzle for exhausting hot gases;

(ii) an add-on pyrotechnic package secured to said pyrogen exhaust nozzle, said add-on pyrotechnic package comprising a suitable container for containing pyrotechnic pellets; and,

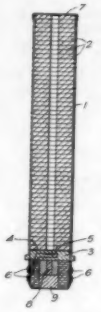
(iii) pyrotechnic pellets contained in said container which are ignitable by hot pyrogen exhaust gases when said hot pyrogen exhaust gases impinge upon said pellets and produces rapid burning of said pellets that are subsequently discharged in the form of hot gases and hot particles along with said hot pyrogen exhaust gases to perform the functions of rapidly sweeping away any undesirable solid propellant perforated grain constituents that have migrated to the surface of said solid propellant perforated grain or reaction products that have formed on said surface from chemical reactions, rapidly igniting said solid propellant, perforated grain, and maintaining a high pressure rate rise in said solid propellant rocket motor which achieves improved ignition and performance of said propellant rocket motor.

**4,391,197**

**SMOKE CARTRIDGE**

**Kjell O. Jacobsen, Raufoss, and Gudmund Engen, Jonsvatnet, both of Norway, assignors to A/S Raufoss Ammunisjonsfabrikker, Raufoss, Norway**

**Continuation of Ser. No. 16,379, Mar. 1, 1979, abandoned. This application Sep. 19, 1980, Ser. No. 188,954**
**Claims priority, application Norway, Mar. 8, 1978, 780819**
**Int. Cl.³ F42B 13/44**
**U.S. Cl. 102—334** **3 Claims**




1. A smoke cartridge for producing instantaneous smoke, comprising:

a casing,

a first compartment within said casing comprising a stack of annular disc shaped smoke elements piled one on top of the other, and a hole passing longitudinally through each smoke element such that the holes through all of the smoke elements form a central passageway passing longitudinally of the casing through the entire first compartment, the forward end of the casing having a releasable cover,

at least some of the smoke producing material of every smoke element being directly exposed to the central passageway, the smoke elements being free of connection to each other, such that immediately upon leaving the casing, each smoke element is separate from the other smoke elements,

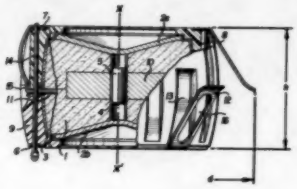
a second compartment separated axially from the first compartment and axially adjacent the rearward end of the first compartment and containing a discharge composition and a means for igniting the discharge composition, said discharge composition comprising substantially the complete ignition composition for igniting all the disc shaped smoke elements, such that upon ignition of the discharge compositon a jet of flames passes into one end of and then through the passageway to ignite all of the smoke elements directly exposed thereto as this same discharge composition expels all of the smoke elements out of the casing, whereupon, immediately upon discharge, each smoke element is free to scatter independently of the other smoke elements,

a third compartment adjacent the second compartment on the side thereof opposite the first compartment, a second discharge composition in said third compartment for propelling the casing itself, and including a delay means between the second and third compartment such that ignition of the second discharge composition is delayed until after the smoke elements have been discharged from the first compartment.

## 4,391,198
## BIDIRECTIONAL DISPERSIBLE SHAPED-CHARGE MINE

Claude Auge, Bourges, France, assignor to Etat Francais, Paris, France

Filed Feb. 11, 1981, Ser. No. 233,496
Claims priority, application France, Feb. 11, 1980, 80 02907
Int. Cl.³ F42B 23/24
U.S. Cl. 102—401 7 Claims

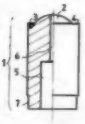


1. A shaped charge mine with action directed along one of the two opposite directions of the axis of revolution perpendicular to the central plane of the mine which is of generally flattened shape, including a substantially cylindrical housing containing the charge to the ends of which housing there are fastened two metal coverings, an igniter provided with a cocking rod extracted by a spring, said mine being characterized by the fact that it comprises a damping means surrounding the housing and imparting to the mine a ratio of height h to outside diameter d which is less than 0.5 in order to assure laying along one or the other of the preferred directions, wherein the damping means consists of a layer of damping material surrounding the housing, on which layer flexible tongues are fastened on opposite sides of the central plane and at a given distance from it, said flexible tongues having free ends which extend away from the axis of revolution and which are substantially oriented in the median plane of the mine.

## 4,391,199
## SAFE AMMUNITION FOR EXHIBITION AND TARGET SHOOTING

Lionel Morin, 20, avenue Gambetta, 19200 Ussel, France

Filed Sep. 24, 1980, Ser. No. 190,261
Int. Cl.³ F42B 5/22, 9/20
U.S. Cl. 102—444 17 Claims



1. Safety ammunition adapted for shooting at a reduced level in order to minimize noise, range and physical danger, said ammunition adapted to be used with various weapons, including both muzzle loading and breech loading weapons, said ammunition comprising:

(a) a plastic charge carrier, said charge carrier comprising a small, tubular container having an interior opening and a closed, generally conical nose, said closed generally conical nose having an enlarged, constant diameter and generally cylindrical portion, a median small collar and a tail provided with an enlarged portion having a uniform diameter which is substantially the same as the enlarged nose portion, said charge carrier being generally hollow and having a narrow, circular groove positioned adjacent to said small collar, said groove comprising a fracture line;

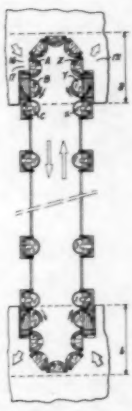
(b) a hollow plastic projectile coupled with said charge carrier, said projectile including an interior opening adapted to receive either the tail or the nose of said charge carrier, said charge carrier and projectile including means for assembling them into a single unit having two different positions, a safety position in which said projectile opening receives said charge carrier tail, and a firing position in which said projectile opening receives said charge carrier nose; and

(c) a holder coupled to said charge carrier and said projectile.

## 4,391,200
## MEDIUM DISTANCE TRANSPORT DEVICE

Roger Bajulaz, Chemin William Barbey 22, 1292 Chambesy, Geneva, Switzerland

PCT No. PCT/CH80/00049, § 371 Date Dec. 16, 1980, § 102(e) Date Dec. 16, 1980, PCT Pub. No. WO80/02403, PCT Pub. Date Nov. 13, 1980
PCT Filed Apr. 25, 1980, Ser. No. 220,069
Claims priority, application Switzerland, May 4, 1979, 4200/79
Int. Cl.³ B61K 1/00
U.S. Cl. 104—20 9 Claims

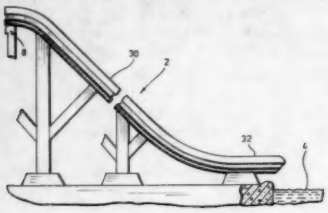


1. Transport device for persons, comprising at least one passenger loading and unloading platform, track means extending along said platform and extending a distance away from said platform, a plurality of passenger cabins movable on said track means into and out of adjacency with said platform, each cabin having a fixed floor and an upright wall extending upwardly from said fixed floor, each cabin having a vertically movable floor that extends laterally outwardly from said fixed floor, means mounting said movable floor for vertical movement relative to said fixed floor, means to raise said vertically movable floor when the cabin is adjacent said platform to bring said movable floor adjacent a level position with the platform, means thereafter to lower said movable floor relative to said fixed floor to permit said movable floor to pass beneath said platform, and a door to close the cabin.

## 4,391,201
## AQUATIC TOBOGGAN SLIDE

Kenneth I. Bailey, R.R. #2, Whitby, Ontario, Canada

Continuation of Ser. No. 174,757, Aug. 4, 1980, abandoned, which is a continuation-in-part of Ser. No. 25,795, Apr. 2, 1979, abandoned. This application Sep. 16, 1981, Ser. No. 302,703
Int. Cl.³ B62B 13/06; A63G 21/18
U.S. Cl. 104—70 10 Claims



1. In an aquatic toboggan slide comprising the combination of a steeply downwardly inclined chute, a plurality of toboggans dischargable down the chute, and a body of water adjacent the lower end of the chute, the improvement wherein:

the chute is in the shape of a trough with continuous side walls and a load bearing bottom surface free of dangerous projections and formed by a plurality of parallel horizontal rollers extending laterally between the side walls, said chute providing a vertical drop of at least about 20 feet and the side walls extending higher than side walls of a toboggan so that a toboggan and rider discharged down the chute will be confined between the chute side walls, the lower portion of the chute being curved so that its discharge end is level and about 12 to about 20 inches above the surface of the body of water, and the curvature of the lower end of the chute being at least about 16 feet in radius, with the rollers being closely spaced at least in the curved lower portion of the chute;

the body of water extends a distance in feet beyond the bottom of the chute which is at least about three times the velocity in feet per second at which a toboggan will leave the chute; and

each toboggan is moulded from synthetic plastics material, has a continuous bottom wall defining the longitudinally ribbed under surfaces inclined upwardly at its front end to a prow, raised side walls, a resilient backless seat member at the rear of the toboggan extending between the side walls and maintained spaced from the bottom wall by a filling of foamed plastic material, a leg space extending forwardly of the seat to, and including a foot rest near the prow of the toboggan, and individual hand grips extending from the toboggan structure and located inwardly of the side walls to either side of the leg space, and between the seat and the foot rest whereby to constrain a rider to assume a position with the rider's hands within the walls and the rider's legs between the rider's arms.

## 4,391,202
## PAPERBOARD LOAD-SUPPORTING PALLET

Leewood C. Carter, 18 Upper Warren Way, Warren, N.J. 07060, and Robin P. Neary, 53 Castle Way, Basking Ridge, N.J. 07920

Filed Feb. 6, 1981, Ser. No. 231,930
Int. Cl.³ B65D 19/34
U.S. Cl. 108—51.3 28 Claims

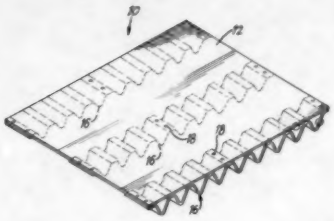
1. A paperboard load-supporting pallet, comprising:

a flat deck formed of a plurality of layers of paperboard;

a plurality of runners extending in a longitudinal direction and attached to the bottom surface of said deck;

each of said runners being formed of a plurality of layers of paperboard and each of said runners including a plurality of spaced, parallel corrugation sections;

each of said corrugation sections including a flat section A attached to said deck, two leg sections B each connected to opposite ends of said flat section, and radius of curvature sections C each having a transverse axis; and

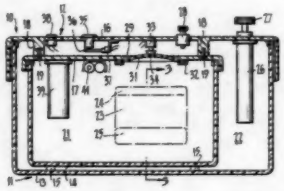


said paperboard runners having a main grain direction in which a majority of the paperboard fibers extend in said longitudinal direction and perpendicular to said transverse axes to provide substantially improved structural rigidity to said runners.

## 4,391,203
## SECURITY APPARATUS

Frederick W. Millar, 3 Fenton Crescent, Frankston 3199, Victoria, Australia

PCT No. PCT/AU80/00025, § 371 Date Feb. 26, 1981, § 102(e) Date Feb. 26, 1981, PCT Pub. No. WO81/00043, PCT Pub. Date Jan. 22, 1981
PCT Filed Jun. 25, 1980, Ser. No. 243,910
Claims priority, application Australia, Jun. 2, 1979, PD9421
Int. Cl.³ E05G 1/12; G08B 13/20
U.S. Cl. 109—25 12 Claims



1. A transportable security container comprising: a hollow receptacle for receiving valuables; an enclosure surrounding the hollow receptacle such as to form between the enclosure and the receptacle a chamber enveloping the receptacle; a chute extending from an opening in the enclosure and through the chamber and into the interior of the receptacle through which to deposit valuables into the receptacle; a flexible diaphragm incorporated in the wall of the receptacle and movable in response to changes of pressure within the chamber; a pack of dye disposed within the receptacle; and means to cause discharge of the dye in response to movement of the diaphragm on change of pressure within the chamber.

## 4,391,204
## SECURITY CABINETS FOR HOTEL ROOMS

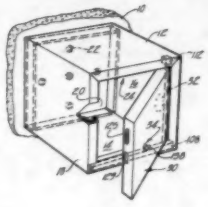
Ernst K. Mitchell, Mt. Clemens, and Richard H. Terry, Bloomfield Hills, both of Mich., assignors to Safekeeper Systems, Inc., Troy, Mich.

Filed Sep. 9, 1980, Ser. No. 185,653
Int. Cl.³ E05G 3/00, 1/04
U.S. Cl. 109—39 4 Claims

1. A security cabinet including a door frame and a door hingedly mounted thereon,

said door having front and rear panels in spaced relation,

a latch keeper in said door frame,
a tamper detector alarm mounted inside said door,
a latch mechanism mounted in the door and having a movable latch plate and a bolt movable therewith adapted to engage said latch keeper when the door is closed and the latch plate is moved from a retracted position to an extended position,
a key-lock mounted in said latch mechanism and having a cylinder adapted to receive a user's key through the front panel of said door,
said key-lock including a cam coacting with said latch bolt and adapted to move it between said retracted and extended positions,



a coin detector mounted in the door and including a detaining lever adapted to engage said latch plate for blocking movement thereof to the extended position unless a valid coin is deposited in said coin detector, whereby said latch plate may be actuated to the fully extended position by rotation of the user's key only when a valid coin is deposited,
a coin box mounted in the door and adapted to receive coins from said coin detector,
said rear panel of said door being movably mounted on said front panel for movement between closed and open positions whereby said rear panel may be opened for servicing of said latch mechanism, coin box and coin detector,
a lock means for said rear panel.

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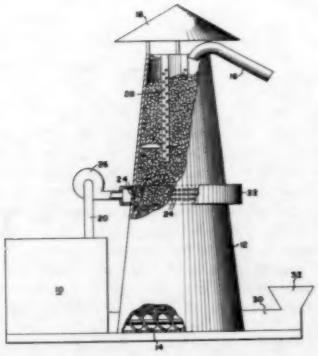
**4,391,205**

## METHOD AND APPARATUS FOR BURNING GREEN WOOD CHIPS

**Norval K. Morey, Box 97, Winn, Mich. 48896**

**Filed Feb. 6, 1981, Ser. No. 231,947**
**Int. Cl.³ F23G 5/04**
**U.S. Cl. 110—224** **5 Claims**



1. Apparatus for burning wood chips comprising a wood chips combusting furnace with an exhaust conduit communicating therewith and leading out of said furnace, a top vented vertically extending silo, separate from said furnace to prevent combustion of its contents but adjacent thereto, filled with a stack of porous cellular wood chips to provide a silo-encased continuous vertical chip column of substantial height, feed means for feeding wood chips from the lower end of said stack to said furnace, supply means for supplying moisture laden wood chips to the upper end of said silo to replenish chips withdrawn from said silo by said feed means, and manifold means on said silo to which said exhaust conduit leads communicating with the exhaust conduit of said furnace for peripherally discharging combustion gases from said furnace into the periphery of the stack of chips in said silo at a location below the top of said stack of chips contained therein to dry the chips in the upper portion of said stack as said gases pass upwardly therethrough to be vented from the top of said silo and to filter contaminants from said gases, said manifold means comprising a manifold band substantially surrounding said silo above the said feed means and substantially below and remote from the said wood chips supply means, there being perforations in the wall of said silo at said band placing the interior of said silo in communication with said manifold whereby combustion gases pass from said manifold into said stack perimetrally through said perforations.

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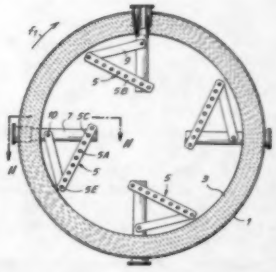
**4,391,206**

## TUBULAR ROTARY FURNACE FOR INCINERATING REFUSE AND THE LIKE, WITH INNER DEMOUNTABLE GRID

**Silvano Matteini, Via Bellosguardo 4A, Florence, Italy**

**Continuation of Ser. No. 3,906, Jan. 16, 1979, abandoned. This application Oct. 31, 1981, Ser. No. 202,897**
**Claims priority, application Italy, Jan. 18, 1978, 11535/78[U]**
**Int. Cl.³ F23G 5/06**
**U.S. Cl. 110—246** **5 Claims**



1. A rotary cylindrical furnace for incinerating refuse and the like comprising:
an outer wall;
grid means mounted about the inner periphery of said outer wall;
with respect to the direction of rotation of said furnace, the forward edge of said grid means being spaced a greater distance apart from said outer wall than the rearward edge of said grid means so that said grid means are inclined with respect to said wall; and
said grid means not extending into the central area of said furnace.

## 4,391,207

## METHOD OF CONDITIONING EXHAUST GASES FROM COAL FIRING

Helge H. Petersen, Copenhagen, Denmark, assignor to F. L. Smidth & Co., Cresskill, N.J.

Continuation of Ser. No. 60,598, Jul. 25, 1979, abandoned. This application Oct. 22, 1981, Ser. No. 313,795

Claims priority, application United Kingdom, Jul. 25, 1979, 31061/78

Int. Cl.³ F23B 7/00

U.S. Cl. 110—342 10 Claims

1. A method of conditioning exhaust gases, containing substantial amounts of dust and lesser amounts of fly ash, from burning processes in a kiln plant, with an electrostatic precipitator, for the treatment of mineral materials which produce the substantial amounts of dust during treatment comprising:

(a) taking a solid fuel;

(b) adding to said fuel at least one alkali-metal compound;

(c) grinding said solid fuel and alkali-metal compound such that at least a portion of the fuel assumes a solid pulverized condition;

(d) feeding into a rotary kiln mineral materials which, upon burning, produce substantial amounts of dust;

(e) introducing said fuel into the rotary kiln in its ground condition;

(f) firing the treated, solid ground fuel in the kiln to burn the mineral materials thereby producing a mineral product and exhaust gases containing the substantial amounts of dust and lesser amounts of fly ash which now contain alkali-metal to reduce resistance;

(g) separating the exhaust gases and the alkali-metal and dust and fly ash by precipitation in the electrostatic precipitator; and

(h) recovering the conditioned exhaust gases.

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## 4,391,208

## METHOD FOR CONTROLLING TEMPERATURES IN THE AFTERBURNER AND COMBUSTION HEARTHS OF A MULTIPLE HEARTH FURNACE

Frederick M. Lewis, Mountain View, Calif., assignor to Sterling Drug, Inc., New York, N.Y.

Filed Sep. 29, 1980, Ser. No. 192,021

Int. Cl.³ F23G 5/04

U.S. Cl. 110—346 23 Claims

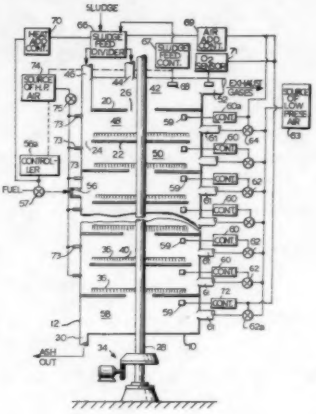
1. In a method of incinerating combustible waste in a multiple hearth furnace containing a series of superimposed hearths which comprises feeding the combustible waste at the upper end of the furnace and passing the waste downward through a series of combustion hearths, supplying air to the combustion hearths to combust the waste material, and discharging the inert solid products of combustion at the lower end of the furnace, while the gaseous products of combustion flow upward countercurrent to the flow of waste material through the hearths and into an afterburner to remove the malodorous gases and/or pollutants, said afterburner being located after the uppermost waste handling hearth, the improvement wherein the temperatures of the afterburner and individual combustion hearths of the multiple hearth furnace are simultaneously controlled by:

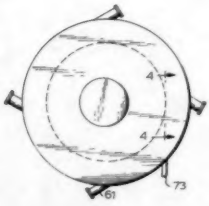
(A) splitting the waste feed between (1) the uppermost waste handling hearth and (2) the hearth directly below the uppermost waste handling hearth in such proportions as to control the temperature of the afterburner to a temperature within preselected limits; and

(B) controlling the supply of combustion air to the individual combustion hearths in sufficient quantities so as to operate the combustion hearths at a temperature at or below a preselected maximum temperature;

wherein said steps (A) and (B) are synchronized in response to the temperature of the afterburner and also in response to the temperatures in the individual combustion hearths by (I) controlling the temperature of the uppermost waste handling hearth below temperatures which would result in thermal stress of the furnace parts beyond safe operating limits and yet high enough to maintain the temperature of the afterburner within preselected limits to remove malodorous exhaust gases, and (II) controlling the temperatures of the combustion hearths by supplying air to the individual hearths in amounts sufficient to control the temperatures of said individual hearths at temperatures at or below preselected maximum temperatures, which temperatures are below that which would cause thermal stress in the furnace parts.

18. In a method of incinerating combustible waste in a multiple hearth furnace containing a series of superimposed hearths which comprises feeding the combustible waste at the upper end of the furnace and passing the waste downward through a series of combustion hearths, supplying air to the combustion hearths to combust the waste material and discharging the inert solid products of combustion at the lower end of the furnace, while the gaseous products of combustion flow upward countercurrent to the flow of waste material through the



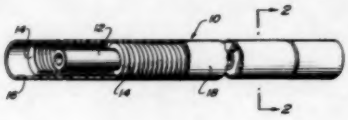

hearths and into an afterburner to remove the malodorous gases and/or pollutants, said afterburner being located after the uppermost waste handling hearth, the improvement comprising directing high velocity jets of small amounts of air into the respective individual combustion hearths at constant air flow rates in amounts sufficient to promote a cyclonic gas flow and create turbulence to ensure uniform mixing of the air and combustion gases so that the temperature in an individual hearth accurately represents the combustion conditions therein and directing large cross-section low velocity streams of air from main air combustion jets into the respective individual combustion hearths for supplying the bulk of the combustion air to control the combustion in the hearths, said air flow rates from the main combustion jets being varied in accordance with the amount of air needed to control the temperatures of the individual hearths in response to the respective temperature of the individual hearths.

**4,391,209**

## EXOTHERMIC CUTTING ELECTRODE

**Paul E. Moore, Lancaster, Ohio, assignor to Arcair Company, Lancaster, Ohio**

**Filed Jun. 16, 1981, Ser. No. 274,118**
**Int. Cl.³ F23B 7/00**
**U.S. Cl. 110—349** **16 Claims**



1. An exothermic cutting electrode for use on land or underwater of the type comprising a metal tube within which are disposed a plurality of elongated metallic rods or wires the electrode adapted to be held by a torch for conducting electrical current to said electrode and a gaseous oxidant through said electrode for ignition and continuation of combustion of the free end of said electrode producing a high temperature flame whereby said electrode and said flame can be brought into contact with a workpiece for performing a cutting operation thereon the improvement comprising:

an inner tube of a metal of the same general type as said outer tube, said inner tube disposed within and spaced apart from said outer tube thus defining an annulus between said tubes;

a mass of metal disposed in said annulus said metal being of the same general type of metal as said inner and outer tubes said electrode constructed to cause flow of gaseous oxidant through said inner tube to produce a jet of oxygen and flame at the free end of said electrode.

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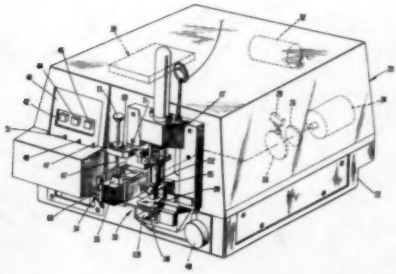
**4,391,210**

## TAG ATTACHING MACHINE

**Michitoshi Watanabe, Nagoya, Japan, assignor to Tomoe Special Machine Co., Ltd., Nagoya, Japan**

**Filed Nov. 13, 1980, Ser. No. 206,613**
**Int. Cl.³ D05B 3/20**
**U.S. Cl. 112—104** **18 Claims**



1. A tag attaching machine comprising:

a feed assembly for feeding tags one at a time from a tag supply to a tag attaching station;

a tag attaching assembly for attaching a tag to an article at the tag attaching station; and

a control network for controlling the sequence of operations performed by the feed assembly and the tag attaching assembly;

said feed assembly comprising:

transport means for moving a tag from the tag supply toward the tag attaching station;

means coupled to said transport means for controlling the distance said transport means moves said tag from said tag supply; and

gauge means coupled to said distance controlling means and adjustable to accommodate the width of said tag, adjustment of said gauge means causing proportional adjustment of said distance controlling means such that the distance said transport means moves said tag is precisely that required to bring the same to said tag attaching station.

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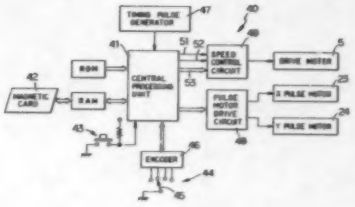
**4,391,211**

## AUTOMATIC SEWING MACHINE

**Yoshikazu Yamamoto, and Toshiaki Yanagi, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan**

**Filed Nov. 7, 1980, Ser. No. 204,993**
**Claims priority, application Japan, Nov. 28, 1979, 54-154055**
**Int. Cl.³ D05B 21/00**
**U.S. Cl. 112—121.12** **9 Claims**




1. In an automatic sewing machine having

stitch forming instrumentalities including an endwise reciprocatory needle, the combination comprising

a drive motor for reciprocating the needle to produce stitches in a workpiece,

drive means operative to vary the relative position between the needle and the workpiece,

stitch instruction storage means for storing stitch instructions capable of influencing the relative positions to form a stitch pattern,

means operative synchronously with reciprocation of the needle for extracting the stitch instruction from the stitch instruction storage means in a predetermined sequence,

position control means responsive to the extracted stitch instruction for controlling operation of the drive means between successive stitches in the stitch pattern,

processing means for scanning all of said stitch instructions in said stitch instruction storage means to determine a maximum permissible speed of said drive motor depending on the variation of said relative position between successive stitches in said stitch pattern and for starting said drive motor to form said stitch pattern after determination of the maximum permissible speed, and

speed control means for limiting the actual speed of said drive motor to no more than said maximum permissible speed during formation of said stitch pattern.

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**4,391,212**

## ELECTRONIC CONTROL SEWING MACHINE

**Yoshimichi Tamiya, Narita-Higashi; Yasukata Eguchi, Kunitachi, and Hachiro Makabe, Fussa, all of Japan, assignors to Janome Sewing Machine Co., Ltd., Tokyo, Japan**

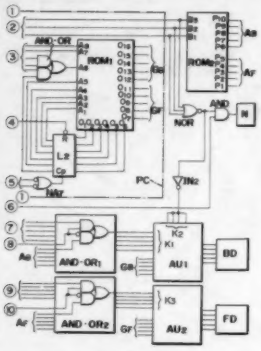
**Filed Oct. 6, 1980, Ser. No. 194,289**
**Claims priority, application Japan, Oct. 5, 1979, 54/128660**
**Int. Cl.³ D05B 3/02**
**U.S. Cl. 112—158 E** **3 Claims**

1. A sewing machine having electronically controlled means to change the lateral position of the needle relative to the fabric to be sewn, comprising

a first memory (ROM1) for storing control data for producing different patterns of stitches including data for producing straight stitches, said first memory having input terminals for receiving address signals and output terminals for releasing control signals for lateral swing of the needle and fabric feed control signals;

stitch pattern selecting means coupled to the input terminals of said first memory to release at the output terminals of the same a set of selected control signals;

a second memory (ROM2) for storing automatic setting data specific to individual stitch patterns stored in the first memory, said second memory having input terminals connected to said pattern selecting means and output




terminals for releasing automatic setting data for the lateral swing of the needle and fabric feed automatic setting data;

operator controlled setting means (VR1, VR2) for releasing optional needle swing setting data and fabric feed setting data for the selected stitch patterns independently from the automatic setting data in the second memory; and

calculating means (AU1, AU2) having input terminals for receiving the control signals from the first memory (ROM1), the automatic setting data from the second memory (ROM2) or the setting data from the setting means (VR1, VR2) to calculate the stich coordinates for each of the stitches of the selected pattern, and output terminals connected to said electronically controlled means.

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**4,391,213**

## NEEDLE THREAD GUIDE DEVICE

**Ernst Dreier, Steckborn, and Kurt Spring, Kreuzlingen, both of Switzerland, assignors to Fritz Gegauf Aktiengesellschaft Bernina-Nähmaschinenfabrik, Steckborn, Switzerland**

**Filed Nov. 5, 1980, Ser. No. 204,281**

**Int. Cl.³ D05B *49/02***

**U.S. Cl. 112—246** **8 Claims**

1. A needle thread guide device for use with a sewing machine provided with a skip stitch mechanism operating at intervals to form stitches of varying lengths comprising:

a thread feeder being operatively, articulated mounted to oscillate in a vertical plane;

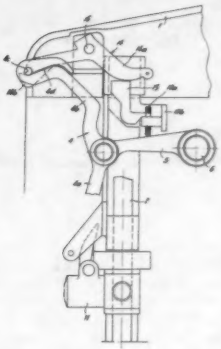
drive means operatively connected to said thread feeder for imparting oscillating motion thereto;

a thread catcher operatively mounted adjacent to said thread feeder;

lever means operatively connected to said thread catcher for engaging and disengaging said thread catcher in synchronism with the skip stitch mechanism;

said thread feeder including a hook eye disposed at one end thereof;

oscillating means operatively connected to said thread feeder for moving said hook eye in an ascending path having an upper reversal point and a descending path;



said thread catcher including a hook eye being aligned in an operative position with the hook eye of said thread feeder at said upper reversal point of said ascending path for catching a thread loop being fed by said thread feeder.

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**4,391,214**

## METHOD AND DEVICE FOR FORMING AN OVERCAST SEAM BY MEANS OF A ZIGZAG SEWING MACHINE

**Helmar Holl, and Rolf Kessler, both of Karlsruhe, Fed. Rep. of Germany, assignors to Dorina Nähmaschinen GmbH, Fed. Rep. of Germany**

**Filed Aug. 28, 1981, Ser. No. 297,415**

**Claims priority, application Fed. Rep. of Germany, Sep. 19, 1980, 80105642[U]**

**Int. Cl.³ D05B *1/20, 3/02***

**U.S. Cl. 112—269.1** **7 Claims**

1. In a method for the formation of an overcast seam using a zigzag sewing machine of the type having a fabric presser, a needle bar carrying a needle with a needle thread movable into first and second overstitch positions, the needle being movable in axial reciprocating motions and pendulum motions selectively oriented transverse thereto between the first and second overstitch positions, a looper carrying a looper thread and a fabric feeder for feeding a fabric in a feed direction, the method being of the type having the steps of forming a first intertwining of the needle thread and the looper thread in the first overstitch position, then moving the needle bar with the needle

thread into the second overstitch position thereby slackening the needle thread, then forming a second intertwining needle thread and looper thread in the second overstitch position whereby the slackened needle thread leading from the first to the second thread loop is pulled into the first overstitch position to form an overstitch loop into which the needle is inserted to form a subsequent loop and then released, the improvement, in combination therewith, comprising the steps of moving the needle bar into the second overstitch position and concurrently feeding the fabric being sewn by one stitch length in the feed direction.

2. In a zigzag sewing machine of the type having a fabric presser, a needle bar carrying a needle with a needle thread movable into first and second overstitch positions, the needle being movable in axial reciprocating motions and pendulum motions selectively oriented transverse thereto between the first and second overstitch positions, A looper carrying a looper thread, and a fabric feeder for feeding a fabric in a feed direction, an improved device for forming an overcast seam, the device being of the type having an oversew mandrel with first and second means for respectively moving the mandrel into two successive positions responsive to rotary and axial movement of the needle to form an overstitch loop in the needle path, and a loop stripper for disengaging the overstitch loop from the oversew mandrel, comprising the improvement wherein the loop stripper is movably mounted to the oversew mandrel for movement responsive to the axial movement of the needle bar in the first overstitch position, the loop stripper including a first arm portion adjacent to the oversew mandrel to supplement the formation of an overstitch loop.

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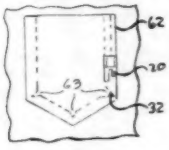
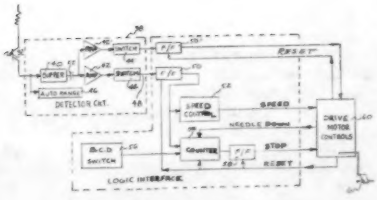
**4,391,215**

## SELF COMPENSATING OPTOELECTRONIC PLY AND EDGE DETECTOR FOR SEWING MACHINE

**Eugene A. Sansone, Belle Meade, N.J., assignor to The Singer Company, Stamford, Conn.**

**Filed Sep. 18, 1981, Ser. No. 303,660**
**Int. Cl.³ D05B** *69/26, 69/20*
**U.S. Cl. 112—275** **12 Claims**




1. A self compensating fabric ply and edge detector for a sewing machine having a frame including a work supporting bed, said frame supporting a needle bar for endwise reciprocation, a sewing needle fastened to one end of said needle bar, a throat plate, a needle accommodating orifice extending through said throat plate, a loop taker supported beneath said throat plate for cooperation with said sewing needle extending through said needle accommodating orifice in the formation of stitches, means for feeding a work fabric through said sewing machine beneath said sewing needle, said fabric ply and edge detector comprising: a light sensing device, means for supporting said light sensing device in said work supporting bed before said needle accommodating orifice in the direction of feed of said work fabric, a source of light for said light sensing device, means for establishing a DC level related to average light reaching said light sensing device, means for passing an AC component of a change in incident light reaching said light sensing device, means for variably diverting current in response to said AC component from said passing means, means for supplying current related to said average light for diversion by said diverting means, and means for initiating a selected response on diversion of current by said diverting means substantially greater than that related to said average light.

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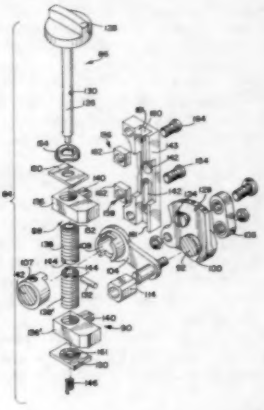
**4,391,216**

## FEED MECHANISM FOR SEWING MACHINES

**James C. Hsiao, Morton Grove, Ill., assignor to Union Special Corporation, Chicago, Ill.**

**Filed Nov. 6, 1980, Ser. No. 204,410**
**Int. Cl.³ D05B** *27/02, 27/22*
**U.S. Cl. 112—316** **27 Claims**



9. A sewing machine having a frame, work support means, revoluble shaft means arranged in the frame beneath the work support means, eccentric means arranged on said shaft means and a work feeding mechanism capable of forward and reverse feeding comprising:

elongated feed bar means having feed dog means arranged at the distal end thereof for movement in a generally orbital path, said feed dog means being adapted to engage and convey a workpiece over said support means;

drive mechanism means including a series of interconnected linkages operatively associated with said eccentric means and said feed bar means;

operator actuated shiftable means associated with said drive mechanism means for translating movement between said eccentric and the feed bar means and capable of selectively varying the direction and amount of workpiece movement as a function of its disposition; and

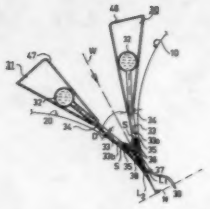
feed regulating means including an aligned spaced pair of limit means provided with a singular adjustment member for independently controlling both limit means whereby controlling the degree of movement and disposition of said shiftable means and thereby the direction and amount of workpiece movement.

**4,391,217**

## SIZE PRESS WITH COATING POOL SUPPRESSING ARRANGEMENT

**Erkki Koski, Jyväskylä, Finland, assignor to Valmet OY, Finland**

**Filed Nov. 20, 1981, Ser. No. 323,426**
**Claims priority, application Finland, Nov. 28, 1980, 803708**
**Int. Cl.³ B05C 3/12**
**U.S. Cl. 118—405** **10 Claims**



1. A size press having at least two coating rollers forming with each other at least one coating nip through which the web to be treated is arranged to run and coating pools at the entrance of the nip between the coating rollers and the web entering said nip, said size press comprising

coating supply apparatus for supplying a coating agent to said coating pools, said coating supply apparatus including filling pieces at said entrance of said nip placed in said coating pools in operation, said filling pieces consisting of one of a liquid permeable porous, and perforated material and suppressing said coating pools and substantially decreasing and preventing splashing of the coating agent.

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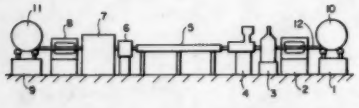
**4,391,218**

## METHOD AND APPARATUS FOR FORMING CORROSION-RESISTANT LAYER AND SURFACE ELECTRICALLY CONDUCTIVE LAYER ON CABLE AND APPARATUS FOR PRACTICING SAME

**Takahiro Horikawa; Yutaka Hibino, and Seiichi Maki, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Division of Ser. No. 152,959, May 23, 1980, Pat. No. 4,315,883.**
**This application Oct. 19, 1981, Ser. No. 312,457**
**Claims priority, application Japan, May 25, 1979, 54-65147**
**Int. Cl.³ B05D 3/12, 1/24**
**U.S. Cl. 118—621** **6 Claims**



1. Apparatus for forming an electrically conductive layer on a corrosion-resistant surface of a cable comprising:

a powder accumulating tank having an inlet and outlet for passing a cable through said tank through a layer formed by accumulating electrically conductive powder therein to allow said powder to adhere to the surface of said cable, and a cloth pipe in said outlet for pressing said powder against said cable at the cable outlet of said powder accumulating tank;

powder applying means for pressing said powder against said cable with a powder applying belt to cause said powder to more firmly adhere to said cable, said power applying means comprising a rotary unit rotated at a speed in proportion to the speed of passage of said cable through said powder applying means and an endless powder applying belt arranged in said rotary unit in such a manner that said endless powder applying belt is tensioned and presses against at least a portion of the surface of said cable;

heating means for heating without surface contact the surface of said cable to melt binder powder mixed with said electrically conductive powder; and

cooling means for blowing air onto the surface of said cable for cooling said cable;

said powder accumulating tank, said powder applying means, said heating means and said cooling means being arranged in the stated order.

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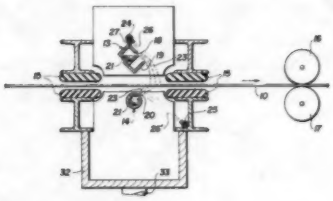
**4,391,219**

## IONIC STRIP COATER

**Edward J. Schaming, P.O. Box 1070, Butler, Pa. 16001**

**Filed Jul. 15, 1981, Ser. No. 283,643**
**Int. Cl.³ B05B 5/04, 7/08**
**U.S. Cl. 118—630** **5 Claims**



1. An apparatus for coating a high speed moving strip with a liquid comprising liquid header delivery means for positioning on at least one side of the strip in spaced relation thereto so as to deliver multiple streams of liquid onto the strip, and simultaneously operable pressurized air spray delivery means directing an air spray onto said streams and dispersing the streams into a multitude of much finer liquid streams in a crossing pattern to completely and uniformly coat said strip, the air spray delivery means substantially surrounding the liquid header and having an outlet substantially in registration with the outlet of the header, and the liquid header and air spray delivery means comprising eccentrically interfitting cylindrical bodies, and means to adjust the eccentric relationship of the bodies one with respect to the other.

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**4,391,220**

## APPARATUS FOR APPLYING FLUID TO ARTICLES

**William C. Kent, Garland, Tex., assignor to Western Electric Company, Inc., New York, N.Y.**

**Filed May 10, 1982, Ser. No. 376,875**
**Int. Cl.³ B05C 3/10, 11/00, 13/02**
**U.S. Cl. 118—707** **10 Claims**

1. An apparatus for applying liquid to an article, which comprises:

an enclosure having an entry door movable from an open to a closed position;

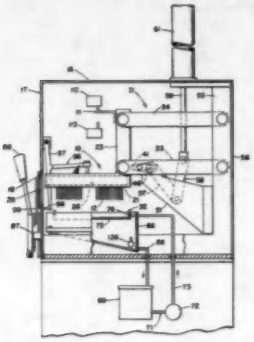
a tank within the enclosure for receiving a quantity of liquid;

a holder for supporting an article with a section extending downwardly toward said tank;

an elevator mechanism for lowering the holder from a load position toward said tank to move the extending section of the article within said tank, and then return said holder to the load position;

means responsive to the closure of said entry door for operating said elevator mechanism;

means responsive to the closure of said entry door for filling said tank with liquid; and



means rendered effective during the return of said elevator mechanism to the load position for draining the liquid from said tank.

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4,391,221

## METHOD FOR MECHANICAL MILK REMOVAL

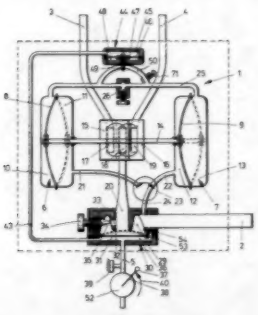
Tilman Hoefelmayr, Niederteufen, Switzerland, and Jakob Maier, Türkheim, Fed. Rep. of Germany, assignors to Biomelktechnik Hoefelmayr & Co., Niederteufen, Switzerland

Filed Jan. 19, 1981, Ser. No. 225,938

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1980, 3001963; Dec. 17, 1980, 3047579

Int. Cl.³ A01J 5/16

U.S. Cl. 119—14.08 35 Claims



1. In a method for mechanical milk removal in which a predetermined underpressure is applied to the interior of a milking cup applied to a teat to remove the milk and a pulsation of a teat rubber is effected at a predetermined frequency and intensity, and while the milking cup is in place the teat is stimulated during a stimulation phase for a predetermined interval prior to the principal milking operation, the improvement comprising wherein no milk is removed for an interval in the range of 40 to 90 seconds after commencement of the stimulation phase and only immediately subsequently thereto is milk removal begun and wherein the pulsation frequency during the stimulation phase is higher than in the milk removal phase.

4,391,222

## MILK METER FOR MEASURING THE TOTAL AMOUNT OF MILK FROM A COW IN THE COURSE OF A MILKING

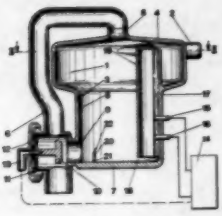
Friedrich Icking, Oelde, and Friedrich Stolte, Halle, both of Fed. Rep. of Germany, assignors to Westfalia Separator AG, Oelde, Fed. Rep. of Germany

Filed Jan. 7, 1982, Ser. No. 337,646

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1981, 3103669

Int. Cl.³ A01J 7/00

U.S. Cl. 119—14.17 11 Claims



1. In a milk meter for milking installations, for the direct measurment of the amount of milk given by a cow during milking, having a separating chamber including a floor, a roof and an outside wall, means for creating a partial vacuum in the separating chamber to effect the separation of the air from the milked milk-air mixture, a measuring chamber, means providing fluid communication between the measuring chamber and the separating chamber including a permanently open inlet aperture in the measuring chamber, two sensors situated at different levels, one above the other, in the measuring chamber for effecting discrete quantity measurements while milk is constantly being fed to the separating chamber, an outlet opening in the separating chamber adjacent the floor thereof and an actuatable valve for opening and closing the outlet opening, the improvement wherein:

the inlet aperture of the measuring chamber is disposed adjacent the floor of the separating chamber and the fluid communication means comprises means forming a weir extending from the floor of the separating chamber upwardly into the separating chamber with the upper edge thereof disposed at a higher level than the inlet aperture, terminating at the outside wall of the separating chamber and having means defining at least one drain hole therethrough.

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4,391,223

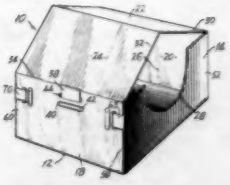
## CARDBOARD HOUSE FOR PETS

Gwendolyn B. Holland, and John W. Holland, both of 97 Gay Bower Rd., Monroe, Conn. 06468

Filed Jul. 21, 1982, Ser. No. 400,345

Int. Cl.³ A01K 1/00

U.S. Cl. 119—19 10 Claims



1. A one-piece cardboard house for an animal or pet, comprising in combination:

(a) a bottom panel constituting a floor,

(b) front and rear panels, and two side panels, each of said panels having two substantially vertical edge portions and being integral with the bottom panel, thereby being adapted to form the four walls of the house,
(c) a pair of roof panels having free edge portions, said roof panels being integral with each other and with one of the side panels of the house, and being hingedly connected with each other and adapted to form a peaked roof,
(d) means releasably joining one free edge portion of one roof panel to the other of said side panels,
(e) means releasably holding the vertical edge portions of the front and rear panels adjacent to corresponding edge portions of the side panels of the house, and
(f) means providing an entrance passage at the front of the house, said entrance passage being defined by edge portions of the front panel and by adjacent front edge portions of the said roof panels,
(g) said front panel having a deep and wide notch in its top edge portion, outlining the bottom of said entrance passage.

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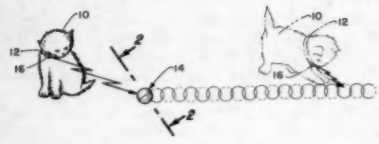
**4,391,224**
**ANIMAL AMUSEMENT APPARATUS**
**Harold A. Adler, 1457 Eastwind Cir., Westlake Village, Calif. 91361**
**Filed Jul. 27, 1981, Ser. No. 287,191**
**Int. Cl.³ A01K *29/00***
**U.S. Cl. 119—29** **3 Claims**




1. Animal attraction apparatus comprising:
motor means for operating only when actuated;
transmitter means for transmitting a signal;
receiver means having an output coupled in actuation relationship to said motor means, said receiver means being for receiving said signal and, when said signal as received is of predetermined power, for causing actuation of said motor means;
attachment means for carrying said transmitter means and for mounting on a domesticated animal of the predator type; and
simulated prey means which is normally unmoving and which, when in motion, tends to attract such animal, said prey means being for carrying said motor means and coupled to said motor means so that said motor means, when actuated, operates to cause said prey means to move;
said transmitter means and receiver means having a signal transmitting and receiving power relationship such that, when said transmitter means is carried by such animal to within a predetermined distance of said prey means, said receiver means actuates said motor means to cause said prey means to move.

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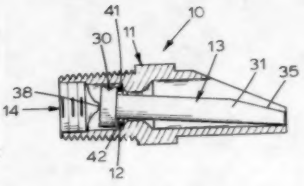
**4,391,225**
**SPRINGLESS NIPPLE WATERER VALVE**
**Jacob D. Sparks, 1005 W. Third, Indianola, Iowa 50125**
**Filed Feb. 18, 1982, Ser. No. 350,052**
**Int. Cl.³ A01K *7/00***
**U.S. Cl. 119—72.5** **4 Claims**

1. A springless nipple waterer valve that is actuable by an animal to provide fluids thereto, comprising:
(a) A valve body having
(1) one end having means for attaching said valve to a source of fluid supply;
(2) a fluid conducting passageway;
(3) a valve seat located in said passageway; and
(4) an opposite end having a cut away portion to expose a portion of said passageway;
(b) a valve member positioned in said passageway and having a valve head and valve stem that extends through said valve seat and has a free end that projects into said exposed portion of said passageway;
(c) a resilient seal member positioned between said valve head and said valve seat;




(d) an abutment member secured in said one end of said passageway and having at least one fluid conducting throughbore and a cone shaped apex end in engagement with the head of said valve member to normally bias said head in sealing contact against said sealing member preventing fluid flow through said valve but permitting said valve head to pivot about said apex;
(e) said valve being actuable by an animal pressing on the free end of said valve stem to pivot said valve head from sealing contact with said sealing member by compressing a portion of said seal member, to thereby permit fluid flow through said valve.

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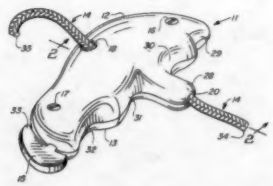
**4,391,226**
**DOG LEASH**
**Richard A. Guthrie, 652 N. 94th Pl., Mesa, Ariz. 85207**
**Continuation of Ser. No. 63,661, Sep. 10, 1979, abandoned, and Ser. No. 199,439, Oct. 22, 1980, abandoned. This application Jan. 25, 1982, Ser. No. 342,186**
**Int. Cl.³ A01K *27/00***
**U.S. Cl. 119—109** **10 Claims**



1. In a leash device:
(a) a leash line having an entrance end and an exit end;
(b) a housing constructed and arranged to lodge in the palm of a user's first hand;
(c) said housing comprising a leash line entrance opening situate in a first surface of said housing facing away from the palm of a user's first hand, a leash line exit opening situate in a second surface of said housing facing away from the user, and a leash line passageway between said entrance opening and said exit opening, said leash line passageway comprising a bearing surface for said leash line;
(d) within said housing, adjacent said bearing surface, variable mechanical compression means for compressing said leash line against said bearing surface;

(e) outside said housing and adjacent thereto, mechanical control means for controlling the compression of said variable mechanical compression means;

(f) said leash line being constructed and arranged to pass through said housing in either direction by passing through said entrance opening, then through said passageway adjacent said bearing surface and said variable mechanical compression means, then out of said housing through said exit opening; and

(g) said leash device being constructed and arranged so that a user's second hand, by controlling said entrance end of said leash line, will control an animal connected to said exit end of said leash line when said mechanical control means is in a non-compression position.

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**4,391,227**

**FLUID-HEATING APPARATUS**

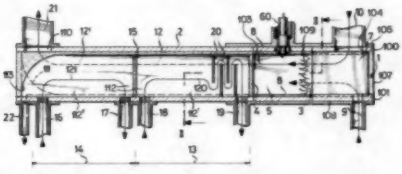
**Siegfried Förster, Alsdorf; Peter Quell, Aachen-Haaren, and Huber Jaegers, Jülich-Welldorf, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich GmbH, Jülich, Fed. Rep. of Germany**

**Filed Apr. 13, 1981, Ser. No. 253,258**

**Claims priority, application Fed. Rep. of Germany, Apr. 14, 1980, 3014245**

**Int. Cl.³ F22B *5/00***

**U.S. Cl. 122—16** **13 Claims**



**1.** A heating unit comprising:

a ceramic burner body formed with a plurality of parallel slit-like passages at least some of which open at a side of said body;

means for supplying a fuel to alternate ones of said passages of said burner body and for supplying a combustion-sustaining gas to the remainder of said passages whereby a combustible gas mixture is formed at said side of said body;

means defining a combustion chamber at said side of said body and into which said some of said openings discharge whereby hot combustion gases are formed in said combustion chamber;

a ceramic recuperator body constituting a unitary ceramic structure with said ceramic burner body and said means defining said combustion chamber, said recuperator body being formed with mutually parallel slit-like channels, alternate ones of said channels communicating with said combustion chamber for conducting said hot combustion gases therefrom; and

means for passing a fluid to be heated through others of said channels in a direction counter to the flow of said combustion gases for heat exchange between said fluid and said combustion gases through walls of said recuperator body between said channels.

**4,391,228**

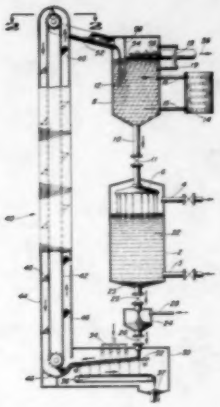
**FALLING SHOT HEATING METHOD AND APPARATUS**

**A. Joe Reinert, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.**

**Filed Aug. 31, 1981, Ser. No. 297,652**

**Int. Cl.³ F22B *1/02***

**U.S. Cl. 122—28** **15 Claims**



**1.** A process for the heating of an aqueous fluid comprising:

(a) circulating an aqueous fluid into a heating zone;

(b) heating a heat-transfer medium to a temperature above its melting point to produce molten heat-transfer medium at an elevation above said heating zone and establishing a reservoir of said molten heat-transfer medium above said heating zone;

(c) sparging said molten medium downwardly through said heating zone whereby the sparged molten medium solidifies to form shot particles and said fluid is heated by said medium as it is cooled and solidified;

(d) recovering hot aqueous fluid from said heating zone;

(e) recovering cooled shot particles from said heating zone; and

(f) recirculating said shot particles and heating said shot particles to produce molten heat-trasfer medium in accordance with step (b).

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**4,391,229**

**STEAM INJECTION APPARATUS**

**Larry G. Turner, 1005 Vine St., Collinsville, Ill. 62234**

**Filed Dec. 29, 1980, Ser. No. 220,739**

**Int. Cl.³ F02D *19/00***

**U.S. Cl. 123—25 B** **4 Claims**

**1.** A steam injection apparatus for an internal combustion engine having an exhaust system, and a vacuum line communicating with the engine, comprising:

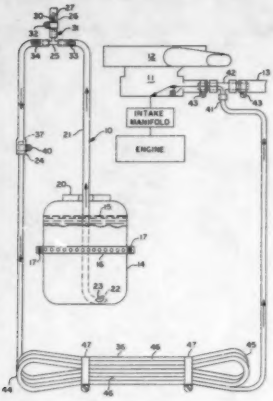
(a) a reservoir of liquid water,

(b) conduit means communicating with the reservoir,

(c) heater means, including a coil of metallic tubing having an inlet communicating with the conduit means, and an outlet communicating with the vacuum line, the coil being placed in heat-receiving relation to the engine exhaust system for heating water in the coil, and

(d) metering means including an air inlet connected in the conduit means for mixing air with water from the reservoir, and means carried by the air inlet for selectively

controlling the amount of air entering the conduit means at a predetermined engine vacuum and thereby solely and




selectively regulating the amount of water flow through the conduit means.

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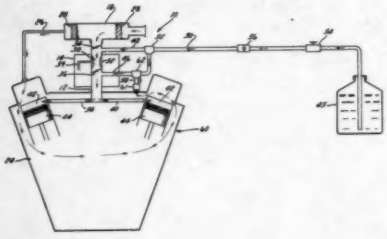
**4,391,230**

**WATER-ALCOHOL INJECTION APPARATUS FOR I.C.E.**

**Eugene B. Pesce, 1724 S. Quince St., Escondido, Calif. 92025, and James A. Krikava, 1110 Lancer La., West, Tarpon Springs, Fla. 33589**

**Filed Mar. 9, 1981, Ser. No. 242,021**
**Int. Cl.³ F02D *19/00*; F02M *25/02***
**U.S. Cl. 123—25 E** **5 Claims**



1. An injection apparatus for injecting a fluid mixture of water and alcohol into a fuel distribution system for an internal combustion engine, the fuel distribution system including

a carburetor having a throttle valve, the carburetor being connected to the intake manifold of an internal combustion engine which includes a crankcase,

said apparatus comprising a reservoir for said fluid mixture,

first conduit means connected to said manifold downstream from said throttle valve,

second conduit means connected to said manifold upstream from said throttle valve,

main passage means connecting said first and second conduit means to said reservoir,

one way flow control means in said main passage means for controlling the flow of fluid mixture to the manifold,

and a third conduit means connected between said first conduit means and the crankcase of the engine,

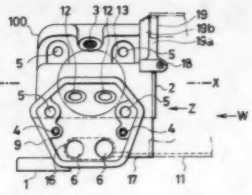
said third conduit means including a pressure-compensating valve positioned to vent crankcase emissions to said first conduit means.

**4,391,231**

**CYLINDER HEAD FOR AIR-COOLED ENGINES**

**Yoshikazu TateBe; Masafumi Egami, and Toshimitsu Miyawaki, all of Nagoya, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Japan**

**Filed Jan. 21, 1981, Ser. No. 226,593**
**Claims priority, application Japan, Mar. 4, 1980, 55-27882[U]**
**Int. Cl.³ F01P *1/02***
**U.S. Cl. 123—41.69** **2 Claims**



1. A cylinder head with a head body for an overhead valve, air-cooled engine having a rocker arm chamber (c), a suction port (21) and an exhaust port (7), comprising a part of a top wall of the cylinder head being depressed downwardly to form said rocker arm chamber (c) and defining a top of a first cooling wind passage (H) which extends over an upper part (15) of said suction portion, said part of the top wall of the cylinder head extending from a side of said exhaust port (7), said first passage (H) formed between a bottom wall (14) of said rocker arm chamber (c) and an upper wall of a cylinder fitting surface (10) of said head, said suction port (21) extending from a top of said upper wall of said cylinder fitting surface, a fin (17) extending around said first passage on a side thereof opposite said exhaust port (7), and a cooling wind guide (19) for guiding a cooling wind to a spark plug side of head, formed integrally with said cylinder head body on a side thereof opposite said cooling first cooling wind passage (H) and near said exhaust port (7) to form a second cooling wind passage (K), said first and second passages passing on opposite sides of said exhaust port.

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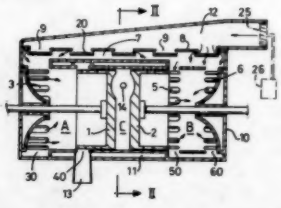
**4,391,232**

**INTERNAL-COMBUSTION ENGINE WITH OPPOSED PISTONS**

**Marcel J. Geirnaert, Assesteenweg 360, B-1741, Wambeek-Ternat, Belgium**

**Filed Mar. 25, 1981, Ser. No. 247,317**
**Claims priority, application Belgium, Mar. 27, 1980, 199984**
**Int. Cl.³ F02B *75/28***
**U.S. Cl. 123—51 BA** **3 Claims**



1. An internal-combustion engine comprising a housing including at least one cylinder unit comprising a cylinder bore with two opposed pistons each having two working faces slidably mounted therein and with fuel admission means, first, second, third and fourth annular channels extending around and adjacent the wall of the cylinder bore over a portion of the

length thereof, each of said annular channels being in communication with the interior volume of the cylinder bore through spaced apart openings, the first and fourth annular channels being located at one end of the cylinder bore and the second and third annular channels being located at the opposite end of the cylinder bore; transfer channel means having a length extending lengthwise of the cylinder bore and extending around and adjacent a portion of the wall of the cylinder bore, said transfer channel means being in direct communication with said first second and third annular channels; air intake pipe means extending lengthwise adjacent and along the length of said transfer channel means, a common partition between the a'r intake pipe means and the transfer channel means along the length of said transfer channel means, said common partition having a plurality of spaced apart apertures therethrough distributed lengthwise of the transfer channel means, said apertures having one-way low-inertia gate means allowing a high rate of air flow from the air intake pipe means through the transfer channel into the cylinder bore and substantially no air flow back from the cylinder bore through the transfer channel means into the air intake pipe means; and an exhaust pipe connected to said fourth annular channel for discharge of the spent products of combustion.

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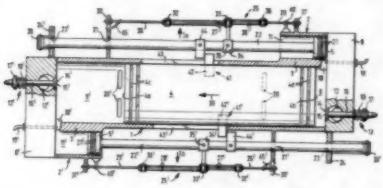
**4,391,233**

## INTERNAL-COMBUSTION ENGINE

**Rudolph Jackisch, 3927 N. Elston Ave., Chicago, Ill. 60618**

**Filed Apr. 3, 1981, Ser. No. 250,874**
**Int. Cl.³ F02B *75/16***
**U.S. Cl. 123—61 R** **13 Claims**



1. An internal combustion engine, having an entire working cycle including combustion air therewith capable of being brought to a compression pressure and being suitable for various types of fuel and for single and dual piston operation, comprising in combination:

at least one working cylinder, which includes a shell provided with a combustion chamber and a working piston having a working cycle including bottom and top dead center therewith;

a crankshaft to which said working piston is operatively connected, said crankshaft including a bent section, which includes a crank bearing rotatably mounted on said bent section, and a crank arm connected to said working piston and to said crank bearing;

at least one auxiliary cylinder associated with each working cylinder and provided with a wall, each of said auxiliary cylinders including an auxiliary chamber and an auxiliary piston which has a piston rod and a working cycle including a decompression phase and a compression stroke as well as having bottom and top dead center positions in which said top and bottom dead center positions of said auxiliary piston are determined by at least one stop device and which moves back and forth and is forcibly controlled in the working cycle of said working piston in which the compression stroke takes place up to approximately 45° after top dead center of said working piston wherein said auxiliary piston compresses the combustion air to the compression pressure necessary for spontaneous ignition just prior to completion of the compression stroke, the combustion chamber and the auxiliary chamber having a volume ratio of approximately 6:1 to approximately 12:1 as to each other;

said working piston being provided with an engaging piece with which a stop on the piston rod of said auxiliary piston coacts so that during at least part of the decompression phase thereof, said working piston drives said auxiliary piston;

an intermediate space connecting each auxiliary chamber with an associated combustion chamber in which said intermediate space widens out from said auxiliary chamber toward said combustion chamber like a Venturi tube, each auxiliary chamber being in constant open communication with its associated combustion chamber via said intermediate space during the entire working cycle of said engine;

an inlet nozzle for each of said combustion chambers for supplying fuel thereto, each inlet nozzle opening into an associated intermediate space and being controlled in the working cycle of said auxiliary piston, and

wherein during the return in the decompression phase, said auxiliary piston is forcibly controlled by said working piston and, during the compression stroke, is moved by means of action of a spring acting on said auxiliary piston which is greater than the maximum compression pressure.

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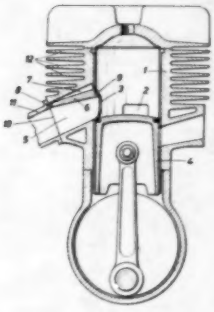
**4,391,234**

## INTERNAL COMBUSTION ENGINE COMPRISING MEANS FOR CONTROLLING THE AXIAL EXTENT OF A PORT IN A CYLINDER

**Johann Holzleitner, Gunskirchen, Austria, assignor to Bombardier-Rotax G.m.b.H., Gunskirchen, Austria**

**Filed Nov. 16, 1981, Ser. No. 321,939**
**Claims priority, application Austria, Dec. 18, 1980, 6172/80**
**Int. Cl.³ F02D *9/06*; F02B *75/02***
**U.S. Cl. 123—65 V** **4 Claims**



1. In a two-stroke-cycle internal combustion engine comprising

cylinder structure having an inside peripheral surface which defines a cylinder bore and is formed with a port which has an axial extent along the axis of said cylinder bore, said cylinder structure being formed with a flow passage which at one end adjoins said port and has a boundary surface portion which adjoins said port at one end of said axial extent,

a piston, which is axially reciprocable in said cylinder bore and adapted to open and close said port, and

a pivoted restricting member which defines said flow passage on one side thereof adjacent to said port and has a restricting edge which faces said port and extends generally in the peripheral direction of the adjacent portion of said inside peripheral surface, said restricting member being angularly movable between a full-flow position, in which said restricting edge is clear of said port, and a restricting position, in which said restricting edge extends

across said port intermediate said axial extent and is substantially flush with said inside peripheral surface,

the improvement residing in that

said restricting member constitutes a hinged member, which is formed with said restricting edge at one end and is pivoted at its end that is opposite to said restricting edge.

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**4,391,235**

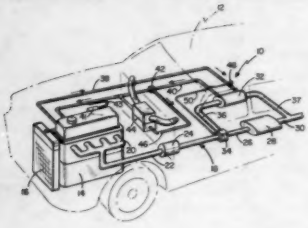
**VEHICLE EXHAUST GAS WARM-UP HEATER SYSTEM**

**David S. Majkrzak, 345 Cherry Ct., West Fargo, N. Dak. 58078**

**Filed May 28, 1981, Ser. No. 267,797**

**Int. Cl.³ F02N *17/02***

**U.S. Cl. 123—142.5 R** **11 Claims**



1. A motor vehicle exhaust gas warm-up system in combination with a motor vehicle, the motor vehicle having an engine with a single cooling system having a liquid coolant for cooling the engine and a conventional exhaust system with a plurality of exhaust pipes and a muffler for conveying hot exhaust gases from the engine, the system comprising:

heat exchanger means for transferring heat from the hot exhaust gases to the coolant;

means for conveying only a portion of the coolant from the engine to the heat exchanger means and back to the engine, the portion being of an amount that substantial interruption of normal coolant flow in the cooling system is avoided;

means for conveying the exhaust gases from the exhaust system to the heat exchanger means;

a diverter valve for diverting the exhaust gases from the exhaust system to the heat exchanger means; and

means for sensing the temperature of the coolant and for actuating the diverter valve at a predetermined coolant temperature to control the flow of exhaust gases to the heat exchanger means.

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**4,391,236**

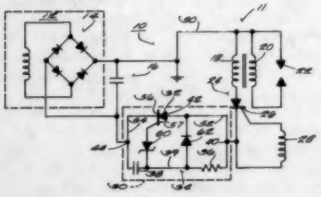
**CD IGNITION WITH AUTOMATIC SPARK RETARD**

**Philip A. Anderson, Waukegan, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.**

**Filed Jul. 24, 1981, Ser. No. 286,699**

**Int. Cl.³ F02D *5/04;* F02P *1/00, 3/06, 1/08***

**U.S. Cl. 123—149 C** **22 Claims**



1. A capacitor discharge ignition circuit adapted for use with an internal combustion engine and for connection to an ignition coil primary winding, said circuit comprising a charge capacitor, an ignition SCR, and spark retard circuit means connecting said charge capacitor and said ignition SCR in series relationship with said primary winding and operative for selectively preventing full discharge of said capacitor through said primary winding for a predetermined period of time after said ignition SCR is rendered conductive, thereby providing for automatic spark retard at higher engine rpm.

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**4,391,237**

**APPARATUS FOR USE IN STARTING A DIESEL ENGINE**

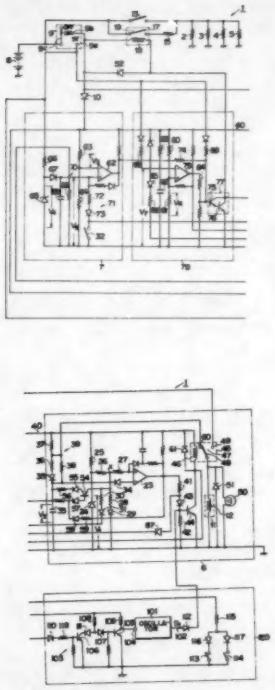
**Yoshiaki Abe, Higashimatsuyama; Yutaka Kubota, Kawagoe, and Hitoshi Sugimoto, Higashimatsuyama, all of Japan, assignors to Diesel Kiki Co., Ltd., Japan**

**Filed Mar. 10, 1981, Ser. No. 242,384**

**Claims priority, application Japan, Mar. 12, 1980, 55/31049**

**Int. Cl.³ F02N *17/00***

**U.S. Cl. 123—179 H** **13 Claims**



1. An apparatus for use in starting a diesel engine having at least one glow plug energized by actuation of an ignition switch having an OFF position, an ON position for connecting said apparatus to a voltage source and an ST position for starting the diesel engine, said apparatus comprising:

means including a first switch for connecting each said glow plug to the voltage source to supply a first level of current to each said glow plug;

means including a second switch for connecting each said glow plug to the voltage source through a resistance adapted to limit the current from the voltage source to supply a second level of current below said first level to each said glow plug;

preheating means for activating said first switch for a first predetermined time period beginning from switching of said ignition switch from the OFF position to the ON position;

afterglow means for activating said second switch for a second predetermined time period beginning from the switching of said ignition switch from the ST position to the ON position; and

controlling means for periodically activating and de-activating said first switch to periodically supply said first level of current and maintain the temperature of each glow plug within a predetermined range during a period of time occurring when said ignition switch is in the ST position.

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**4,391,238**

## AIR-COOLED INTERNAL COMBUSTION ENGINE

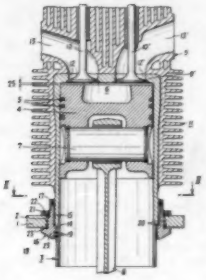
**Josef Greier, and Colin T. Pomfret, both of Graz, Austria, assignors to Hans List, Graz, Austria**

**Filed Mar. 26, 1981, Ser. No. 247,745**

**Claims priority, application Austria, Mar. 31, 1980, 1747/80**

**Int. Cl.³ F02F *1/02***

**U.S. Cl. 123—193 C** **6 Claims**



1. An air-cooled internal combustion engine which comprises a crankcase which defines an inner space and an outer space, said crankcase including at least one opening therein which communicates between the inner space and the outer space; a cylinder barrel fitted in each opening to extend from the inner space to the outer space, each cylinder barrel including a first external threaded portion located along the length thereof in the region of the associated opening and a second external threaded portion located along the length thereof in the outer space; a bearing ring positioned between each cylinder barrel and the associated opening in which it fits, each bearing ring extending from the inner space to the outer space and including a flange portion located in the inner space which is abuttable against the portion of the crankcase forming the associated opening, an internal threaded portion which is cooperable with at least said first external threaded portion of the associated cylinder barrel, and an outer threaded portion located on a portion thereof which is in the outer space; a ring nut screwed on said outer threaded portion of each bearing ring to brace the bearing ring to the portion of the crankcase forming the associated opening; and a lock nut screwed on said second external threaded portion of each cylinder barrel to brace the cylinder barrel to the associated bearing ring.

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**4,391,239**

## INVERSION PROTECTION OF OUTBOARD MARINE ENGINES

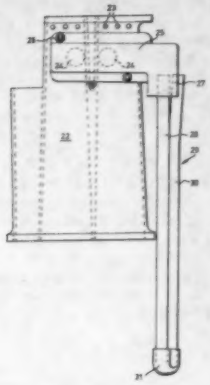
**Michael B. J. Brinton, East Cowes; John Barnes, and Peter D. Chandler, both of Newtown, all of England, assignors to R.N.L.I. (Trading) Limited, Dorset, England**

**Filed Aug. 4, 1980, Ser. No. 174,766**

**Int. Cl.³ F02B *77/00***

**U.S. Cl. 123—198 E** **10 Claims**

1. A method of inversion-protecting an outboard marine engine having a starter motor, spindle, and solenoid and engine power pack including a coil and terminal blocks located in a main engine casing, wherein all of the water-sensitive electrical equipment within the main engine casing is enclosed in one or more watertight boxes fitted inside the casing, the casing itself being open to ingress of water and protecting all other water



sensitive engine regions from ingress of water upon inversion of the engine.

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**4,391,240**

## INTERNAL COMBUSTION ENGINE

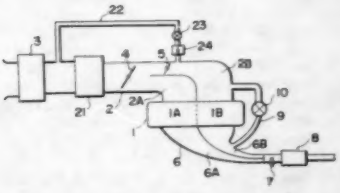
**Fukashi Sugasawa, Yokohama, and Haruhiko Iizuka, Yokosuka, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed Mar. 26, 1980, Ser. No. 134,314**

**Claims priority, application Japan, Mar. 27, 1979, 54-35015**

**Int. Cl.³ F02D *17/03***

**U.S. Cl. 123—198 F** **26 Claims**




1. An internal combustion engine comprising:

(a) first and second cylinder units each including at least one cylinder;

(b) an intake passage provided therein with a throttle valve and divided downstream of said throttle valve into first and second branches leading to said first and second cylinder units, respectively, said second intake passage branch having therein a first valve means which is normally open;

(c) an exhaust passage divided into first and second branches leading from said first and second cylinder units, respectively;

(d) a first passage having one end opening into said second exhaust passage branch and another end opening into said second intake passage branch, said first passage having therein a second valve means which is normally closed;

(e) fuel supply means for supplying an optimum amount of fuel to said first and second cylinder units under varying conditions;

(f) a load detector responsive to engine load for providing a low load indicative signal when the engine load is below a predetermined value;

(g) means responsive to the low load indicative signal to inactivate said second cylinder unit;
(h) delay means responsive to the low load indicative signal from said load detector for providing a drive signal a predetermined time after the arrival of the low load indicative signal thereto; and
(i) first valve drive means responsive to the drive signal from said delay means for closing said first valve means and opening said second valve means.

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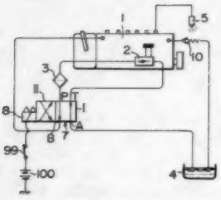
**4,391,241**

## STOPPING DEVICE FOR ENGINE SUPPLIED WITH FUEL BY FUEL INJECTION PUMP

**Hidetoshi Dohshita, Okazaki; Yoshiya Ishii, Toyota, and Nobuyuki Fujitani, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Nov. 19, 1980, Ser. No. 208,415**
**Claims priority, application Japan, Dec. 21, 1979, 54-166333**
**Int. Cl.³ F02D *17/00***
**U.S. Cl. 123—198 DB** **7 Claims**



1. A stopping device for an engine which has a key switch and which is supplied with fuel by a fuel injection pump connected to a fuel tank by a fuel supply pump driven by the engine, comprising:
a change-over valve movable between a first position and a second position,
said change-over valve connecting said fuel tank with an inlet of said fuel supply pump and connecting an outlet of said fuel supply pump with an inlet of said fuel injection pump when disposed in the first position, and
said change-over valve connecting the inlet of said fuel injection pump with the inlet of said fuel supply pump and connecting the outlet of said fuel supply pump with said fuel tank when disposed in the second position; and
an electromagnetic actuator for electromagnetically actuating said change-over valve in response to the position of said engine key switch so that said change-over valve is held in the first and second positions during engine operation and engine shutdown, respectively.

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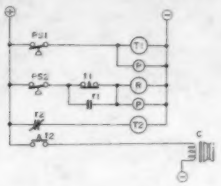
**4,391,242**

## CONTROL DEVICE FOR AUXILIARY MEMBERS OF A VEHICLE

**Sakae Mashio, Tatebayashi, Japan, assignor to Tama Manufacturing Co., Limited, Gumma, Japan**

**Filed May 20, 1981, Ser. No. 265,359**
**Claims priority, application Japan, May 23, 1980, 55-68758**
**Int. Cl.³ F02D *11/08*; B60H *3/04*; F02B *77/00***
**U.S. Cl. 123—198 R** **9 Claims**

1. A control apparatus for a vehicle-mounted auxiliary device to be driven by an engine, comprising:
a pair of pressure switches to detect the load through the negative pressure intake of the engine;
means to detect the rate of acceleration of the load by the difference in operation time between the pressure switches;
control means to control the driving of said auxiliary device, and
means to transmit a signal to the control means of said auxiliary device to suspend operation of the auxiliary device for the time period from when the acceleration rate of the



load on the driving system of the vehicle exceeds a predetermined level until the time the load of the driving system of the vehicle returns to the predetermined level.

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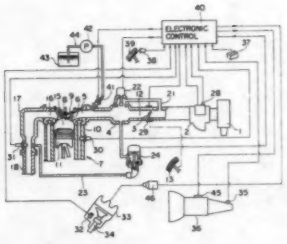
**4,391,243**

## METHOD AND APPARATUS OF SUPPLYING FUEL IN ELECTRONIC CONTROL FUEL INJECTION ENGINE

**Hironori Bessho, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Feb. 12, 1982, Ser. No. 348,179**
**Claims priority, application Japan, Sep. 11, 1981, 56-142535**
**Int. Cl.³ F02D *5/02***
**U.S. Cl. 123—325** **6 Claims**



1. A fuel supply method for an electronic control fuel injection engine in which a fuel injection valve is operated by electric signals to control an amount of fuel supply from the fuel injection valve to an intake system, characterized in that, when a brake device is operated or vehicle speed is higher than a predetermined value, the rotational speed of the engine with the fuel cut-off being completed in the deceleration of the vehicle and the fuel supply being resumed is set to a value smaller than that otherwise set.

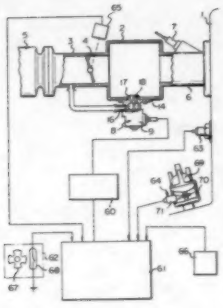
4. An apparatus for supplying fuel to an electronic control fuel injection engine in which a fuel injection valve is operated by electric signals to control an amount of fuel supply from the fuel injection valve to an intake system, characterized in that said apparatus comprises a first detecting means for detecting the operation of a brake device, a second detecting means for detecting vehicle speed, a comparator means for comparing the rotational speed of the engine with a reference value to allow the fuel injection valve to be operated when the rotational speed of the engine is lower than the reference value and a control means for receiving detecting signals from the first and second detecting means to set thereby the reference value of the comparator means lower than that set otherwise when the brake device is operated or the vehicle speed is higher than a predetermined value.

4,391,244

## DEVICE OF CONTROLLING THE IDLING SPEED OF AN ENGINE

Mamoru Kobashi, Aichi; Shinichiro Tanaka, Susono, and Hideo Saji, Aichi, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota and Nippondenso Co., Ltd., Kariya, both of, Japan

Filed Jun. 11, 1982, Ser. No. 387,755
Claims priority, application Japan, Jun. 22, 1981, 56-95213
Int. Cl.³ F02D 11/10
U.S. Cl. 123—339 10 Claims



1. A device of controlling the idling speed of an engine comprising a main intake passage, a throttle valve arranged in the main intake passage, a bypass passage branched off from the main intake passage upstream of the throttle valve and connected to the main intake passage downstream of the throttle valve, and a control valve arranged in the bypass passage, said device comprising:

a step motor actuating the control valve for controlling the amount of air flowing within the bypass passage;

first means for detecting the engine speed to produce an output signal indicating the engine speed,

second means for detecting the operating condition of the engine to produce an output signal indicating that the engine is operating in an idling state,

electronic control means operated in response to the output signal of said first means and the output signal of said second means and producing continuous control pulse signals at predetermined first time intervals for rotating the step motor in a stepping manner at a first speed in a direction wherein the engine speed approaches a desired engine speed when the engine is operating in an idling state, and;

power supply control means including an ignition switch and inserted between said electronic control means and a power source, said electronic control means producing continuous control pulse signals at predetermined second time intervals which are longer than said first time intervals for rotating the step motor in a predetermined direction at a second speed which is lower than said first speed when the ignition switch is turned to the OFF position.

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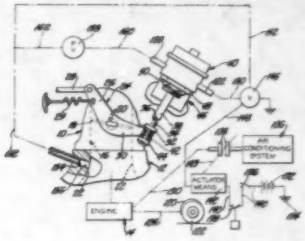
4,391,245

## PRESSURE OPERATED THREE-POSITION THROTTLE STOP ASSEMBLY

William C. Larson, Rochester, Mich., assignor to Colt Industries Operating Corp., New York, N.Y.

Filed Oct. 19, 1981, Ser. No. 312,392
Int. Cl.³ F02M 3/00
U.S. Cl. 123—339 18 Claims

1. Apparatus for variably stopping the closing movement of throttle valve means controlling the flow of motive fluid to an associated combustion engine, comprising variably positionable abutment means effective for operative engagement with said throttle valve means when said throttle valve means is moved toward a closed position, said abutment means when in a first position being operatively engagable by said throttle valve means when said throttle valve means is moved to a normal idle throttle position, said abutment means being effective when in said first position to hold open said throttle valve means a relatively small first amount, pressure responsive movable wall means effective upon being exposed to a first vacuum generated by said engine for moving said abutment means to a second position whereat said throttle valve means when moved toward said closed position operatively engages said abutment means to thereby be held open a relatively larger second amount, said pressure responsive movable wall means



being effective upon being exposed to a second vacuum generated by said engine for moving said abutment means to a third position whereat said throttle valve means is held open a relatively greatest third amount, and resilient means, said resilient means being the only resistive means effective to operatively resiliently resist the movement of said abutment means from said first position to said second position and from said second position to said third position, said resilient means exhibiting only a single spring rate and being devoid of abrupt changes in the spring rate thereof during the entire distance of movement of said abutment means from said first position to said third position.

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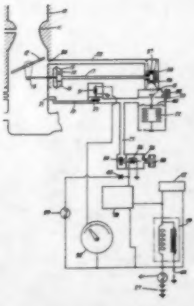
4,391,246

## THROTTLE OPENER DEVICE FOR VEHICLE ENGINES

Etsuo Kawabata, Wakoh; Masahiko Ogura, Sakado; Akinobu Takagi, Yokohama, and Akira Fujimura, Niiza, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 144,325, Apr. 28, 1980, abandoned.
This application Jun. 7, 1982, Ser. No. 385,488
Claims priority, application Japan, May 7, 1979, 54-54705; Nov. 20, 1979, 54-151264
Int. Cl.³ F02S 11/10; F02D 1/04; F02M 19/12
U.S. Cl. 123—391 7 Claims



1. For use with an internal combustion engine for driving a vehicle, the engine having an intake passage provided with a

throttle valve and a throttle valve opener, the improvement comprising, in combination: a suction passage connecting said throttle valve opener with a vacuum port on the intake passage downstream from said throttle valve, a vacuum responsive throttle opener control valve in said suction passage which transmits a controlled vacuum pressure into said throttle valve opener when the vehicle speed is above a predetermined speed, vacuum pressure regulating means positioned in said suction passage between said vacuum port and said throttle opener control valve, said vacuum pressure regulating means including restriction means and including atmospheric intake valve means, said vacuum pressure regulating means acting to reduce vacuum pressure transmitted from said vacuum port to said throttle opener control valve in response to an operative state of the engine.

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**4,391,247**

## AIR FLOW DETECTION ARRANGEMENT

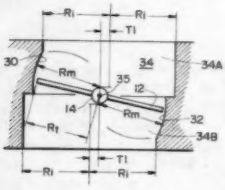
**Giichi Shioyama, Yokosuka; Yoshitaka Hata, Fujisawa, and Masao Nakajima, Atsugi, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed Oct. 14, 1980, Ser. No. 196,524**

**Claims priority, application Japan, Oct. 15, 1979, 54-132624**

**Int. Cl.³ F02D** *9/08*

**U.S. Cl. 123—403** **9 Claims**




1. In an internal combustion engine, having a cylinder and an induction passage leading from the ambient atmosphere to said cylinder, an air flow sensor comprising:

a manually controlled butterfly valve operatively disposed in said induction passage and rotatable for controlling the amount of air inducted through said induction passage;

a position sensor operatively connected to said butterfly valve for sensing the angular position thereof and producing an output signal indicative of said sensed position; and

means defining a curved wall on one of said butterfly valves and said induction passage for restricting the air flow past said butterfly valve as it opens from a closed position and for causing said air flow to be essentially proportional to the opening degree of said butterfly valve whereby said signal outputted by said sensor accurately indicates said air flow.

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**4,391,248**

## METHOD FOR CLOSED-LOOP CONTROL OF THE IGNITION ANGLE OR THE COMPOSITION OF THE OPERATIONAL MIXTURE FURNISHED AN INTERNAL COMBUSTION ENGINE

**Reinhard Latsch, Vaihingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Sep. 29, 1980, Ser. No. 191,743**

**Claims priority, application Fed. Rep. of Germany, Sep. 29, 1979, 2939590**

**Int. Cl.³ F02D** *33/00;* **F02P** *5/10*

**U.S. Cl. 123—425** **6 Claims**

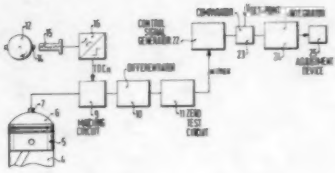
1. A method of closed-loop control for the composition of an operational mixture furnished to an internal combustion engine for combustion therein, comprising the steps of:

ascertaining the occurrence of the top dead center in sequential work cycles of at least one combustion chamber of the engine;

measuring the magnitude of the combustion chamber pressure of said at least one combusting chamber with a pressure probe;

ascertaining the occurrence of the peak combustion chamber pressure from the measured magnitude of the combustion chamber pressure, relative to the ascertained top dead center occurrence in sequential work cycles of said at least one combustion chamber;

generating a control signal as a function of the difference between two successive occurrences of the peak combustion chamber pressure relative to the occurrence of the top dead center in sequential work cycles of said at least one combustion chamber;




generating a set-point value for the control signal;

comparing the generated control signal to the generated set-point value and generating a difference signal; and

adjusting the proportion of at least one component of the operational mixture in accordance with the generated difference signal.

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**4,391,249**

## METHOD OF OPERATING A COMBUSTIBLE MIXTURE GENERATOR OF AN INTERNAL COMBUSTION ENGINE AND APPARATUS FOR CARRYING OUT THE METHOD

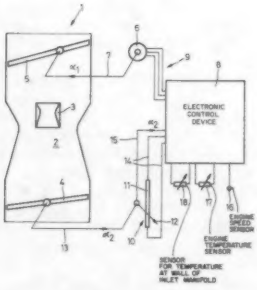
**Valerio Bianchi, Neuss-Hoisten; Franz-Josef Ehrentraut, Mönchengladbach, and Peter Wöbky, Dormagen, all of Fed. Rep. of Germany, assignors to Bosch und Pierburg System oHG, Neuss, Fed. Rep. of Germany**

**Filed Jun. 30, 1980, Ser. No. 163,992**

**Claims priority, application Fed. Rep. of Germany, Jul. 11, 1979, 2927881**

**Int. Cl.³ F02M** *7/06*

**U.S. Cl. 123—438** **17 Claims**


ELECTRONIC CONTROL DEVICE
ENGINE SPEED SENSOR
ENGINE TEMPERATURE SENSOR
SENSOR FOR TEMPERATURE AT WALL OF INLET MANIFOLD

1. In a method of operating a combustible mixture generator of an internal combustion engine to produce a transition mixture enrichment during acceleration of said engine, said mixture generator including means defining a mixing chamber, a main throttle downstream of said chamber, a choke valve upstream of said chamber, an electric drive for operating said choke valve, means for sensing at least one operating parameter of said engine, and a control device which is controlled by said sensing means and controls said electric drive to move said choke valve into positions for cold starting, running-up and hot-running mixture enrichment, said method comprising the steps of holding said choke valve open in steady operation of

said engine, sensing the instantaneous degree of opening of said main throttle valve with the sensing means, and when the speed of opening said main throttle exceeds a predetermined threshold value conveying respective signals from the sensing means to the control device and from the control device to the electric drive for temporarily abruptly at least partly closing said choke valve by a predetermined magnitude by means of said electric drive and measuring at least one of a plurality of operating parameters of said engine and making said predetermined magnitude and the duration of said closing of said choke valve dependent upon the measurements of said at least one parameter.

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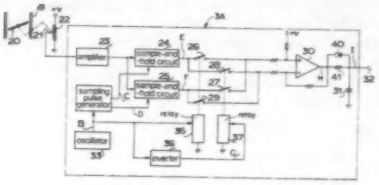
## 4,391,250
## SYSTEM FOR DETECTING THE OPERATION OF THE THROTTLE VALVE

**Fujio Matsui, Mitaka, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo and Nissan Motor Co., Ltd., Yokohama, both of, Japan**

**Filed Aug. 1, 1980, Ser. No. 174,373**
**Claims priority, application Japan, Aug. 2, 1979, 54-98918**
**Int. Cl.³ F02D *35/00***
**U.S. Cl. 123—438** **11 Claims**



1. A system for detecting the operation of a throttle valve of an internal combustion engine, comprising

means comprising a transducer for converting a physical parameter of the operation of the throttle valve into an electrical signal constituting an output voltage of said transducer,

holding circuit means for periodically operatively receiving the output voltage of said transducer with respect to time and holding constant a value proportional to the periodically received output voltage of said transducer,

an output circuit means for continuously producing a resulting voltage corresponding to the change of said value, at every periodic time interval of the operation of said holding circuit means, from said value at the respective prior time interval and proportional to angular velocity of the throttle valve respectively.

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## 4,391,251
## ELECTRONIC CONTROLLER FOR CONTROLLING THE AIR/FUEL RATIO OF THE MIXTURE SUPPLIED TO AN INTERNAL COMBUSTION ENGINE

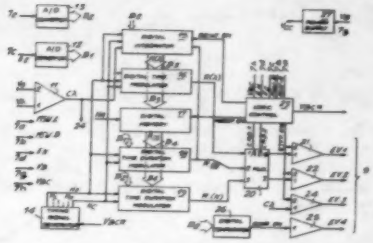
**Pierre Planteline, and Roger Machetel, both of Paris, France, assignors to Groupement d'Interet Economique de Recherche et de Developpement PSA, Paris, France**

**Filed Oct. 16, 1980, Ser. No. 197,604**
**Claims priority, application France, Oct. 19, 1979, 79 26045**
**Int. Cl.³ F02B *3/00***
**U.S. Cl. 123—440** **10 Claims**

1. A digital electronic controller for regulating the air/fuel ratio of the mixture supplied to the cylinders of an internal combustion engine, having an EGO sensor situated on the exhaust path of the burned gases, at least one fuel supply device, such as a carburetor, whose fuel flow rate can be modified by an electrovalve controlled on the basis of an opening/closing cycle and a plurality of sensors for measuring operating conditions of this engine, said electronic controller comprising:

a clock signal generator providing synchronous signals and a clock signal at the electrovalve cycle frequency;

a closed loop digital circuit of the proportional integral type with variable gain, said closed loop being connected between said EGO sensor and said electrovalve and including a digital integrator having a gain control input receiving a digital signal representative of the rotation speed of the



motor, a digital time duration modulator having a control input connected to the EGO sensor, and a multiplexer for opening said closed loop, said multiplexer having a command input connected to a logic circuit sensitive to operating conditions of said motor and at least a second input receiving a command signal sensitive to a motor physical parameter such as the temperature or the rotation speed of the motor.

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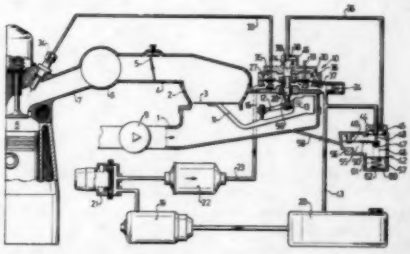
## 4,391,252
## FUEL INJECTION SYSTEM

**Günther Jäggle, Stuttgart; Klaus-Jürgen Peters, Affalterbach, and Klaus Riel, Möglingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Jun. 3, 1981, Ser. No. 270,210**
**Claims priority, application Fed. Rep. of Germany, Jun. 7, 1980, 3021561**
**Int. Cl.³ F02M *39/00***
**U.S. Cl. 123—454** **5 Claims**



1. A fuel injection system for compressor-equipped internal combustion engines having injection into an intake tube, in which a flow rate member and an arbitrarily actuatable throttle valve are disposed in sequence downstream of a compressor, the flow rate member being movable counter to a restoring force in accordance with a quantity of air flowing therethrough, and a valve disposed in a fuel supply line having a movable element for metering a fuel quantity corresponding to the quantity of air, characterized in that said restoring force is generated by means of pressure fluid, which is exerted continuously upon a control slide under a constant but arbitrarily variable pressure supplied by a control pressure line, said restoring force, and the variation of the pressure of the pressure fluid being effected by means of at least one pressure control

valve controllable in accordance with engine characteristics, further wherein said pressure control valve includes a movable valve element upon which a compression spring acts in the closing direction of the pressure control valve, the force of said spring exerted upon the movable valve element being capable of reduction with increasing intake tube pressure downstream of said compressor.

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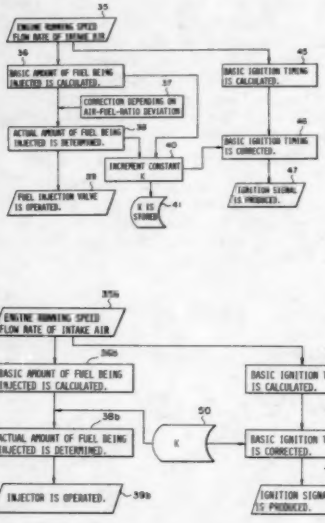
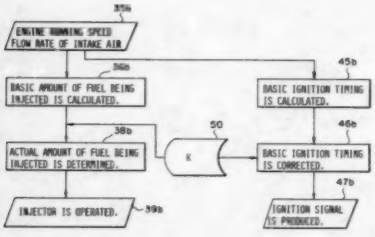
## 4,391,253
## ELECTRONICALLY CONTROLLING, FUEL INJECTION METHOD

**Sumio Ito, Gotenba, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan**

**Filed Apr. 24, 1981, Ser. No. 257,132**
**Claims priority, application Japan, Oct. 29, 1980, 55-150627; Oct. 30, 1980, 55-151390**
**Int. Cl.³ F02D 37/02**
**U.S. Cl. 123—478** **11 Claims**




1. In an electronically controlling, fuel injection method, wherein a gasoline fuel containing alcohol is supplied via an electromagnetic fuel injection valve into an intake system of an engine; comprising the steps of:

storing in a storage means a comparison value representing a comparison of a basic amount of fuel being injected and an actual amount of fuel being injected, in closed loop controlling, said basic amount of fuel being injected calculated on the basis of operational parameters of the engine, and said actual amount of fuel being injected being determined by correcting said basic amount of fuel being injected on the basis of air-fuel-ratio feedback signals, and wherein a basic ignition timing is calculated on the basis of operational parameters of the engine, and said basic ignition timing is corrected on the basis of said comparison value, whereby an actual ignition timing is obtained; and

correcting said basic amount of fuel being injected on the basis of said comparison value, in open loop controlling, in order to determine an actual amount of fuel being injected.

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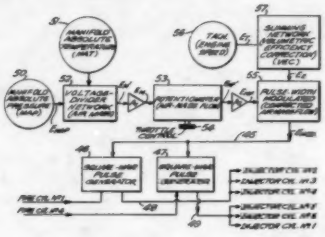
## 4,391,254
## ATOMIZATION COMPENSATION FOR ELECTRONIC FUEL INJECTION

**Richard E. Staerzl, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.**

**Filed Dec. 11, 1981, Ser. No. 329,993**
**Int. Cl.³ F02M 51/00**
**U.S. Cl. 123—478** **6 Claims**




1. In an electronic fuel-injection control circuit for an internal-combustion engine having an intake air manifold wherein a square-wave pulse generator provides output signals of variable duration, said output signals controlling the fuel flow rate to the internal combustion engine with an output signal of a first duration providing an increased fuel flow rate and an output signal of a second duration providing a decreased fuel flow rate, said first duration being greater than said second duration, the improvement comprising, means for sensing the air temperature within said intake air manifold, means for detecting the instantaneous speed of said internal combustion engine, means responsive to a decrease in manifold air temperature for increasing the duration of said output signals and responsive to an increase in manifold air temperature for decreasing the duration of said output signals, and means responsive to a decrease in engine speed for increasing the duration of said output signals and responsive to an increase in engine speed for decreasing the duration of said output signals, said detecting means including a linear inverting operational amplifier, a first input of said operational amplifier having applied thereto a signal linearly related to engine speed, a second input of said operational amplifier having applied thereto a predetermined bias voltage, and the output of said operational amplifier being at a maximum value when said engine speed is minimum and being at a minimum value when said engine speed reaches a predetermined value in excess of said minimum engine speed.

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## 4,391,255
## PROGRAMMED SEQUENTIAL FUEL INJECTION IN AN INTERNAL COMBUSTION ENGINE

**Richard E. Staerzl, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.**

**Filed Feb. 6, 1981, Ser. No. 232,374**
**Int. Cl.³ F02D 17/00**
**U.S. Cl. 123—481** **6 Claims**

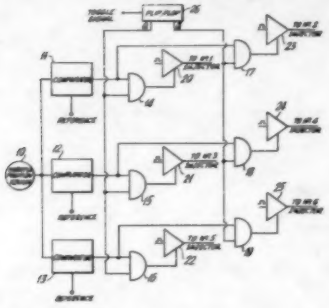
1. A fuel-injection control circuit for an internal-combustion engine, said internal-combustion engine having a variable position throttle and a plurality of engine cylinders with each cylinder having associated therewith individually controllable fuel injection apparatus, the fuel injection control circuit comprising,

means for generating a throttle position control signal whose voltage level is dependent upon the movement of said variable position throttle from a closed position to an open position and from an open position to a closed position,

means for comparing the voltage level of said throttle position control signal with a fixed reference level and for generating a predetermined pattern of logic signals in response to said comparison,

a bistable device which changes state once per crankshaft revolution of said internal combustion engine and

means responsive to said predetermined pattern of logic signals and to the state of said bistable device for applying enabling signals to a minimum number of said individually controllable fuel injection apparatus at an essentially closed throttle position, for progressively applying said



enabling signals to a greater number of said individually controllable fuel injection apparatus as said variable position throttle moves from an essentially closed position to nearer said open position and for applying said enabling signals to all of said individually controllable fuel injection apparatus when said variable position throttle reaches said open position.

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**4,391,256**

## AIR-FUEL RATIO CONTROL APPARATUS

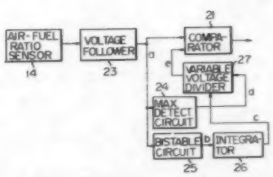
**Hiroshi Sawada, and Takayuki Demura, both of Susono, Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan**

**Continuation of Ser. No. 153,521, May 27, 1980, abandoned. This application Aug. 9, 1982, Ser. No. 406,574**

**Claims priority, application Japan, Jun. 4, 1979, 54-68804**

**Int. Cl.³ F02B *3/08***

**U.S. Cl. 123—489** **3 Claims**




1. An air-fuel ratio control apparatus for an internal combustion engine having an exhaust system and means for supplying secondary air to the exhaust system, said apparatus comprising:

sensor means disposed in the exhaust system, for detecting the concentration value of a predetermined constituent in the exhaust gas of the engine, said sensor means generating a first signal which indicates the concentration value of the predetermined constituent in the exhaust gas;

first circuit means for calculating the average value of the first signal from said sensor means, said first circuit means generating a second signal indicative of the calculated average value that represents the closed loop air-fuel ratio in the exhaust system to which the secondary air is supplied;

second circuit means for generating a reference signal based upon the first signal and the second signal, comprising means for detecting the maximum value of the first signal and means for dividing the signal derived from said maximum value detecting means by a variable division factor, to generate the reference signal, said variable division factor being continuously changed responding to said second signal;

third circuit means for making a comparison between the values of said first signal and said reference signal, said third circuit means generating a control signal which indicates the result of said comparison; and

means for adjusting the amount of secondary air supplied to the exhaust system in response to said control signal from the third circuit means.

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**4,391,257**

## FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

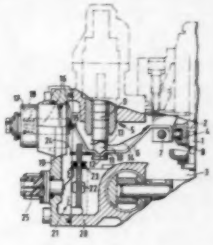
**Franz Eheim, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Feb. 15, 1980, Ser. No. 121,867**

**Claims priority, application Fed. Rep. of Germany, Mar. 10, 1979, 2909556**

**Int. Cl.³ F02D *1/18, 5/00***

**U.S. Cl. 123—503** **1 Claim**



1. A fuel injection pump having a housing for internal combustion engines having a control member for a fuel injection quantity actuatable by means of an adjusting member of an rpm governor via a governor lever and a drag spring which stresses said governor lever counter to a shut off direction which permits a sufficient range of motion relative to said rpm governor, and further having an electric servomotor, said servomotor including an electromagnet, an armature and a force spring which drives against said armature for adjusting the control member into a stop position in which a fuel supplied by the pump is diverted and not used, characterized in that said armature of said servomotor engages said governor lever and therethrough is connected in a force-locking manner with said control member so that upon the adjustment effected by means of said servomotor, the position of said adjusting member of the rpm governor remains unchanged, and said force spring acts upon said armature so that a fuel diversion, when the electromagnet is switched off, is triggered via said force spring and said armature.

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**4,391,258**

## ARRANGEMENT FOR DRIVING A MECHANISM IN AN INTERNAL COMBUSTION ENGINE

**Dick V. Claesson, Södertälje, Sweden, assignor to Saab-Scania Aktiebolag, Sodertalje, Sweden**

**Filed Feb. 26, 1981, Ser. No. 238,654**

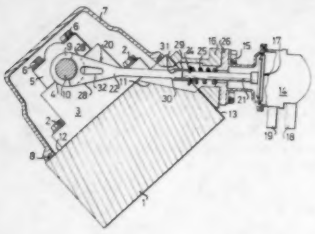
**Claims priority, application Sweden, Mar. 6, 1980, 8001778**

**Int. Cl.³ F02M *37/04***

**U.S. Cl. 123—508** **7 Claims**

1. In apparatus for mechanically driving a mechanism associated with an internal combustion engine: a driven rotatable shaft having a rotation axis, said shaft having a peripheral groove which has side walls and a bottom wall forming a continuously curved cam surface which is eccentric to the rotation axis of said shaft; a push rod having a first end drivingly connected to said mechanism and a second end having a

fork configuration including two extensions which are oriented radially on either side of the cam surface and, between said extensions, a curved surface engaging said cam surface so that rotation of said shaft imparts oscillating axial motion to said push rod and swinging movement to said second end of said push rod, said two extensions residing in said groove and being engageable with the side walls of said groove whereby said swinging movement of said second end of said push rod is accommodated, whereby said second end of said push rod is



guided by said side walls in the longitudinal direction of said shaft and whereby no extra guidance is needed in the axial direction of said push rod, wherein said push rod comprising first and second longitudinal portions and means connecting said first and second portions in end-to-end relationship in a manner to accommodate angular play during said transverse movements of said first end, said first longitudinal portion incorporating said first end and said second longitudinal portion incorporating said second end.

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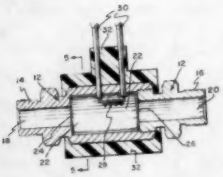
**4,391,259**

## FUEL CONDITIONER AND METHOD OF CONDITIONING FUEL TO AN INTERNAL COMBUSTION ENGINE THEREWITH

**Milfred W. Urban, 1819 N. Edwards, Wichita, Kans. 67203**

**Filed May 22, 1981, Ser. No. 266,332**
**Int. Cl.³ F02M *15/00***
**U.S. Cl. 123—557** **3 Claims**



1. A fuel conditioner comprising a conduit shell body having a pair of compression connection ends; said shell body having a structure defining a fuel entrance conduit, a fuel exit conduit and a heating chamber interposed between the entrance conduit and the exit conduit and in communication with each; a first agitating screen means and a second agitating screen means respectively covering the point of communication opening of the entrance conduit and the exit conduit with the heating chamber; a pair of electrical conduit means passing through said shell body into said heating chamber; a heating coil means electrically attached in series to the ends of said pair of electrical conduits in said heating chamber; and electrical power means engaging the other ends of said electrical conduits for energizing the heating coil means, said fuel entrance conduit and said fuel exit conduit are essentially aligned in the same plane and directly opposed with respect to each other; said heating chamber is generally cylindrical, said point of communication opening of said fuel entrance conduit has a diameter smaller than the diameter of said generally cylindrical heating chamber in order to additionally agitate the fuel through expansion and to lower the flow velocity of same as the fuel flows through said first agitating screen means into the heating chamber, said lowering of said flow velocity allows the fuel to spend adequate time in said heating chamber to be heated by the heating coil; said point of communication opening of the fuel exit conduit has a diameter smaller than the diameter of the generally cylindrical heating chamber in order to increase the velocity of the heated fuel as it passes through the second agitating screen means into the exit conduit of the shell body; an overmold means circumscribing the shell body, said electrical conduit means passing through said overmold means; and said overmold means circumscribes the structural portion of said shell body that defines the heating chamber.

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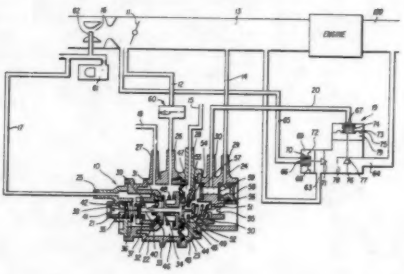
**4,391,260**

## FLUID PRESSURE RESPONSIVE VALVE DEVICE

**Kiyonobu Asahi, Anjo, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Dec. 9, 1980, Ser. No. 214,786**
**Claims priority, application Japan, Dec. 17, 1979, 54-164322**
**Int. Cl.³ F02M *25/06***
**U.S. Cl. 123—568** **8 Claims**



1. A fluid pressure responsive valve device including an exhaust gas recirculation device, said fluid pressure responsive valve device comprising:

a body having an inlet port, at least one signal pressure port connected to an engine intake means and first and second outlet ports formed therein,

means disposed within said body movable in response to fluid pressure communicated to said signal pressure port,

a hollow rod secured to said movable means and comprising a part of a first passage member connecting said inlet port and said first outlet port,

a second passage member for connecting said inlet port and said second outlet port, said second passage member including restriction means, said second outlet port being in fluid communication with said exhaust gas recirculation device, and

a plurality of first valve means arranged within said first and second passages, respectively, to thereby control fluid communication through said first and second passage members in response to movement of said movable means,

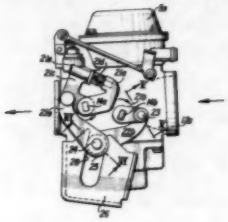
wherein said exhaust gas recirculation device comprises a third passage member connected between an engine exhaust manifold and said intake means, said third passage member including parallel flow portions, wherein said exhaust gas recirculation device further comprises second valve means connected to said intake means for selectively closing said third passage member and third valve means connected to said third passage member for selectively closing one of said parallel flow portions of said third passage member.

4,391,261

## CARBURETOR ACTUATING SYSTEM FOR V-ENGINES

Yoshiaki Tomita, Hamakita, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Jul. 16, 1981, Ser. No. 283,932
Claims priority, application Japan, Jul. 8, 1980, 55-107649
Int. Cl.³ F02B 13/00
U.S. Cl. 123—584 8 Claims



1. A dual carburetor system for a V-engine utilizing two carburetors, each having a throttle valve stem protruding through at least one side, the protruding valve stem of one having connected to it a drive arm, and the protruding valve stem of the other having connected to it a driven arm, characterized in that the carburetors are positioned side by side in the V-shaped space between two engine cylinders with said valve stems having said drive arm and driven arm fixed thereto protruding toward each other; said drive arm being connected to said driven arm by means of two connecting links hinged to the respective drive and driven arms at one end of each and hinged to each other at their other ends; and a slot in a plate between the carburetors to constrain motion of said hinge between the links along a perpendicular bisector of a line passing through the axes of the protruding valve stems of the two carburetors.

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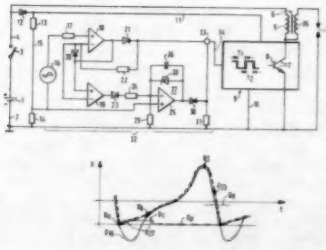
4,391,262

## IGNITION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Richard Schleupen, Ingersheim, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 20, 1981, Ser. No. 313,358
Claims priority, application Fed. Rep. of Germany, Oct. 28, 1980, 3040509
Int. Cl.³ F02P 1/00
U.S. Cl. 123—618 8 Claims



1. Ignition system for an internal combustion engine having means (16) operating similarly to an a-c generator for generating an ignition signal (U16);
an ignition coil (5, 6);
a controlled switch (7, 8) controlling current flow through the ignition coil;
and a signal processing stage (32, 9) interconnecting the signal generating means (16) and the controlled switch (7, 8) for rendering the controlled switch conductive, to store electromagnetic energy in the coil, at an instant of time during which the ignition signal changes in value in a first predetermined direction, and rendering the controlled switch non-conductive, and hence interrupting current flow through the coil and cause a high-voltage ignition pulse to appear thereacross, at an instant of time during which the ignition signal changes values, and in opposite direction,
wherein, in accordance with the invention,
the signal processing stage includes means (32) deriving a first control signal portion (Ua-Ub) occurring in advance of the peak value of the ignition signal, and having an at least approximately uniformly changing rate in said first direction during at least part of the time when the ignition signal changes level or value in the opposite direction;
and means (33) combining said first control signal portion and the ignition signal at a time (Ub) when both the ignition signal and the first portion of the control signal are changing in said first direction, and said ignition signal is at a level below its peak value (Us),
so that the differential, in a voltage-time diagram of the control signal portion (Ua-Ub) and the ignition signal portion below the peak thereof (Ub-Us) will have the same sign.

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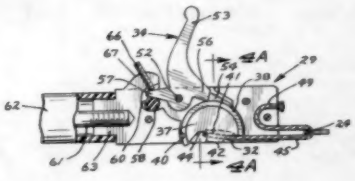
4,391,263

## BOWSTRING RELEASE DEVICE

Paul A. Dodge, Rte. 3, Menomonie, Wis. 54751

Filed Mar. 19, 1981, Ser. No. 245,355
Int. Cl.³ F41B 5/00
U.S. Cl. 124—35 A 27 Claims



1. A bowstring release device useable by an archer in conjunction with an arrow and a bowstring mounted on a bow to effect release of the bowstring to discharge the arrow along an intended forward longitudinal path of travel, said device comprising:
a housing having interior walls defining an interior cavity with a latch opening and a trigger opening;
a latch member having a generally flat central base located in the cavity for rotation about an axis generally perpendicular to the intended longitudinal path of travel of the arrow and having a generally segmented circular arcuate rib portion outwardly extended from both sides of the base in a direction parallel to said axis of rotation;
said interior walls defining said cavity shaped to closely conform to the latch member and having generally segmented circular arcuate groove means on both sides of the base located to define the path of travel of the rib portion of the latch member upon rotation of the latch member in the cavity, said rib portion of the latch member being movably located in said groove means to support the latch member and to guide rotation of the latch member about said axis generally perpendicular to the intended longitudinal path of travel of the arrow;
said latch member having a generally rearwardly facing shoulder accessible through the latch opening defining a cord retaining seat rotatable between a cord retaining

position and a cord release position upon rotation of the latch member;

trigger means in said cavity having a trigger finger extended through the trigger opening for engagement and movement by an archer, said trigger means operatively connected to the latch member for rotation of the latch member from the cord retaining position to the cord release position upon movement of the trigger finger; and

handle means connected to the housing.

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**4,391,264**

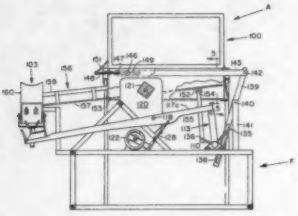
**BALL PITCHING APPARATUS**

**Jeffrey L. Abraham, 218 Maplewood, San Antonio, Tex. 78216, and Gary D. Banse, 546 Gilbert, San Antonio, Tex. 78213**

**Filed Feb. 23, 1981, Ser. No. 236,660**

**Int. Cl.³ F41B 7/00**

**U.S. Cl. 124—50** **4 Claims**



1. A ball feeding apparatus for an automatic ball pitching machine, comprising:

a power drive means for driving the machine;

a ball de-jammer means operated by the power drive means for preventing the clogging of balls being delivered to a ball throwing arm,

a ball container having a stationary sloping floor member for holding a plurality of balls for delivery to said ball de-jammer means which is adjacent said container;

said ball de-jammer means having a ball de-jammer operated by the drive means to engage balls for preventing jamming of balls to a ball feed channel to allow at least one ball to be supplied from the ball container at predetermined intervals;

said de-jammer means having a tilting floor member movable between horizontal rest and inclined positions to selectively roll balls to a ball feed channel;

said de-jammer means having a horizontally reciprocating member to engage and remove balls so as to prevent a plurality of balls in the ball container from engaging and jamming a ball which is to be released by the tilting action of said tilting floor member upon operation of the de-jammer means by the power drive means.

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**4,391,265**

**KEY-(TOUCH-) CONTROLLED GAS RANGE**

**Si-Yu Chen, 37 Kueiyang St. Sec. 1, Taipei, Taiwan**

**Filed Jan. 26, 1981, Ser. No. 228,181**

**Int. Cl.³ F24C 3/00**

**U.S. Cl. 126—39 E** **3 Claims**

1. A controlled gas range comprising:

means for adjusting the flame intensity in a controlled manner;

a continuous electronic ignition circuit;

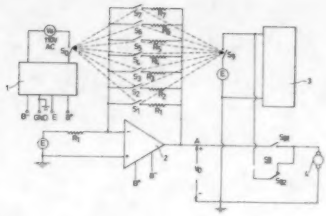
a valve; and

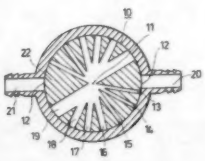
a burner,

characterized in that said valve includes a rotor defining a plurality of channels therein, a housing and a servo-motor connected to said rotor, a gas inlet and a gas outlet said gas outlet having a diameter slightly greater or equal to that of the largest channel within the rotor, said gas inlet and said gas outlet being respectively provided on said housing in an opposing relationship to each other, said gas inlet further being connected to a gas source and said gas outlet further being directed to the burner;

said housing further including an upper face defining a small orifice with a diameter sufficient to supply the amount of gas for a base fire, said orofice being connected to and adjacent to said electronic ignition circuit of said burner by a tube;

said plurality of channels including communicating channels and at least one blocked channel at symmetrical positions in said rotor, the size of said communicating channels being different for each symmetrical position, said communicating channels communicating with the center of said rotor so that there are channels with different sizes connected between said gas inlet and outlet under different rotating angles of said rotor thereby directing various amounts of gas to said burner, said gas inlet and said outlet both being blocked by said rotor when said rotor is rotated with an angle for said blocked channel to cut off the gas supply, said channels including one base fire channel which is blocked at one end so that the base fire channel is only connected between said gas inlet and said orifice when said rotor is rotated with an angle for said base fire channel.





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**4,391,266**

**STOVE APPARATUS**

**Arthur J. Leffers, 13004 Tonkel Rd., Fort Wayne, Ind. 46825**

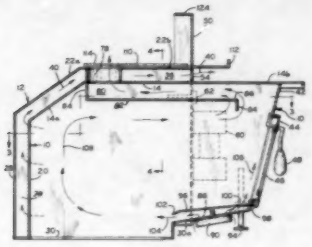
**Filed Jan. 12, 1981, Ser. No. 224,431**

**Int. Cl.³ F24B 7/00**

**U.S. Cl. 126—123** **16 Claims**

1. Stove apparatus comprising a firebox, a heat-exchange housing enclosing said firebox and spaced therefrom to provide air circulating passages, said firebox having a top, lateral sides and a rear end, said housing also having a bottom, top, lateral sides and a rear end respectively spaced in substantial parallelism from the corresponding parts of said firebox, a front closure on said firebox having an access door, said spaced lateral sides of said firebox and housing defining air inlet passages having at the front ends thereof air inlet ports, said spaced tops defining an air outlet passage in communication with said inlet passages and having at the front end thereof an air outlet port, means connected to said inlet ports for supplying a flow of air to said inlet passages, means for admitting combustion air to said firebox, and means for venting smoke from said firebox in by-passing relation to said housing and said

top air outlet passage, said firebox projecting beyond the front portion of said housing, said top of said firebox being in the form of a plate having a flat horizontal portion which projects forwardly of said housing and is exposed thereby providing a



stove top, said top plate of said firebox engaging at the lateral edges thereof said housing sides thereby further defining said inlet passages, the space between said housing and firebox rear ends serving to connect said inlet passages to said outlet passage.

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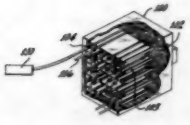
**4,391,267**

## HEAT STORAGE MATERIAL

**Gustaf O. Arrhenius, La Jolla, Calif., assignor to Kay Laboratories, Inc., San Diego, Calif.**

**Filed Apr. 15, 1981, Ser. No. 254,547**
**Int. Cl.³ F24H** *7/00;* **C09K** *3/18;* **F28D** *17/00*
**U.S. Cl. 126—400** **15 Claims**



1. In combination,

a melt formed from at least one of sodium thiosulfate pentahydrate and sodium sulfate decahydrate and having properties of crystallizing into a monolithic mass when nucleated, and

an additive material having properties of dissolving stably in the melt and metastably in the growing crystals and exsolving to separate the resulting crystallites and limit their size and having properties of providing the solution of the additive material in the melt with chemically basic properties,

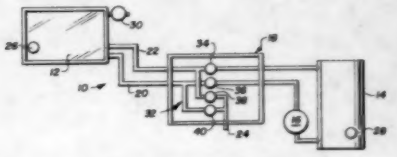
the additive material consisting of at least one of disodium hydrogen phosphate, trisodium phosphate and their potassium and ammonium analogs.

**4,391,268**

## SOLAR WATER HEATER CONTROL AND PROTECTION SYSTEM

**Donovan B. Mathes; Floyd B. Hamilton, and Douglas C. Spreng, all of Lake Havasu City, Ariz., assignors to Solar Dynamics Inc., Lake Havasu, Ariz.**

**Filed Feb. 24, 1981, Ser. No. 238,108**
**Int. Cl.³ F24J** *3/02*
**U.S. Cl. 126—437** **2 Claims**



1. A solar water heater system wherein a collector receives a liquid from a tank through a feed conduit and provides said liquid to said tank through a return conduit, and first and second drain down valves connected to said first and second conduits, respectively, are operable to drain said liquid from said system, comprising:

first and second isolating valves respectively situated in said feed and return conduits that isolate said tank from said conduits when said fluid is being drained;

a venting valve connected to said collector and to the atmosphere that allows a flow of air therethrough into said conduits and said collector in response to said system being drained;

a reversible gear motor; and

linkage means for sealing said isolating valves prior to opening said drain down valves and for closing said drain down valves prior to opening said isolating valves.

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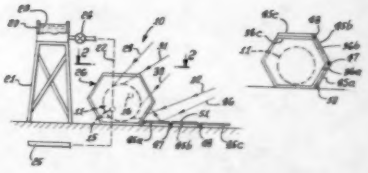
**4,391,269**

## CONTROLLED SOLAR HEATING AND HEAT RETENTION OF LIQUID

**W. Keith R. Watson, P.O. Box 1537, Rancho Santa Fe, Calif. 92067**

**Filed Sep. 28, 1981, Ser. No. 305,970**
**Int. Cl.³ F24J** *3/02;* **G02B** *5/08*
**U.S. Cl. 126—437** **11 Claims**



1. In solar heating apparatus:

(a) a generally horizontally elongated tank to contain liquid, the tank being solar radiation absorbing,

(b) a generally longitudinally extending horizontally elongated container extending about said tank, the container defining glazing facing one side of the tank and top portion of the tank, adapted to received impingement of solar radiation, the glazing spaced from the tank, and being insulative,

(c) and solar radiation auxiliary reflecting panels including at least one panel projecting generally away from a region below the level of the lower extent of the tank and exteriorly of the container to reflect solar radiation toward and through said glazing for impingement on the tank, said

panels being hinge supported and having alternate positions in which they have been swung to extend adjacent the glazing facing the side and top portion of the tank to block heat loss from the tank at night,

(d) the container being polygonal in lateral upright planes, and having planar generally rectangular sections of said glazing, the panels sized in correspondence to said glazing sections to which they extend respectively adjacent, in said alternate positions.

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4,391,270

## MAGNETIC MEDICAL TREATMENT MEMBER

Hideaki Uragami, 12-12, Mefugaoka, Takarazuka-shi, Hyogo 665, Japan

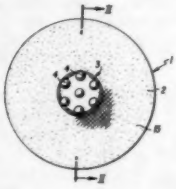
PCT No. PCT/JP80/00115, § 371 Date Apr. 6, 1981, § 102(e) Date Feb. 17, 1981, PCT Pub. No. WO81/00357, PCT Pub. Date Feb. 19, 1981

PCT Filed May 28, 1980, Ser. No. 237,165

Claims priority, application Japan, Aug. 6, 1979, 54-100519; Jan. 24, 1980, 55-7860[U]

Int. Cl.³ A61N *1/42*

U.S. Cl. 128—1.3 13 Claims



1. A magnetic treatment member comprising a generally flat magnetic press element mounted on a sticking surface of a sticking member, said magnetic press element having a generally flat surface extending to an outer peripheral edge of said magnetic press element, said magnetic press element having an outer peripheral wall along said outer peripheral edge, and a plurality of projections protruding from said flat surface, said projections extending substantially to said outer peripheral edge such that said projections are substantially continuous with said outer peripheral wall, whereby the lines of magnetic force are concentrated on said projections.

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4,391,271

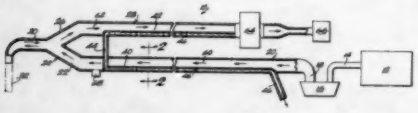
## RESPIRATOR CIRCUIT

Albert Blanco, 3315 SW. 127th Ave., Miami, Fla. 33175

Filed Apr. 6, 1981, Ser. No. 251,358

Int. Cl.³ A61M *16/00*

U.S. Cl. 128—203.12 24 Claims



1. A respirator circuit comprising:

first and second conduit tubes, the cross-section of which has opposed planar lower side portions that are angled oppositely downwardly and inwardly toward drainage means connected thereto, said first and second conduit tubes in open connection respectively to first and second branches of a generally Y-shaped conduit tube portion, including a leg portion for open connection to a conventional endotracheal tube;

a respirator connected to an end of the first conduit tube through a water cascade to humidify air, oxygen enriched air or pure oxygen passing from the respirator into the first conduit tube;

the drainage means disposed at a lowermost point of and extending longitudinally along the bottom portions of the first and second conduit tubes, said drainage means being in fluid communication with said first and second conduit tubes through a plurality of perforations opening into the drainage means from the first and second conduit tubes; and

means to dispose of moisture passing through said perforations into the drainage means from the first and second conduit tubes.

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4,391,272

## DISPOSABLE SYRINGE

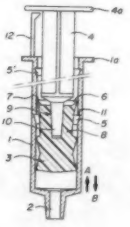
Jackie Staempfli, Paris, France, assignor to Tulcea, S.A., Vaduz, Liechtenstein

Filed Mar. 9, 1979, Ser. No. 19,251

Claims priority, application Switzerland, Mar. 10, 1978, 2624/78

Int. Cl.³ A61M *5/00*

U.S. Cl. 604—110 10 Claims



1. A disposable syringe comprising:

a cylinder, one end of which cylinder is formed with a nozzle whereby a syringe needle can be fixed to the cylinder;

an intake and delivery piston capable of sliding inside said cylinder comprising a body arranged so as to form a tight movable partition, said body having a circular groove or channel;

a rod connected with the piston body so as to permit said body to be displaced by sliding movement in the cylinder;

at least one resilient member provided in said piston body and having at least one peripheral rim or flange tending to be applied to the inside wall of said cylinder;

at least one resilient sealing joint provided in said piston of which at least one peripheral part in the form of an O-ring is retained by a wedging action between the inside wall of the cylinder and said circular groove or channel of said piston body;

at least a first circular groove, in the inside wall of said cylinder, perpendicular to the axis of the cylinder and having an edge capable of retaining the rim of the resilient member; and

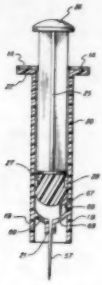
at least one second circular groove, in the inside wall of said cylinder, perpendicular to the axis of the cylinder and arranged in such a way as to receive the toroidal part of the sealing joint;

whereby the said first groove and said second groove are so disposed as to cause, when the piston body is pulled in a rearward direction, the disconnection of the sealing joint from the piston body and the retention thereof in the second groove, and then the locking of the rim or edge of the resilient member against the edge of the first groove opposite to that end of the cylinder which has the nozzle.

## 4,391,273
## NON-REUSABLE, DISPOSABLE SYRINGES

Marcelo Chiquiar-Arias, Mexico City, Mexico, assignor to Mercantile & Technical Promotions Inc., New York, N.Y.

Filed Jul. 30, 1981, Ser. No. 288,264
Claims priority, application Mexico, Aug. 8, 1980, 183508
Int. Cl.³ A61M 5/00
U.S. Cl. 604—110 9 Claims



1. A disposable syringe which renders itself non-reusable which comprises a rigid cylinder having a bottom wall at one end with an opening for the exit of the solution to be injected, and having the other end open, support flanges being affixed to said cylinder adjacent the open end and extending outwardly from the axis of the cylinder, an injection needle integrally attached to the bottom wall of the cylinder and extending outwardly beyond said bottom wall and communicating with said opening, and a plunger with a piston slidably positioned within the cylinder with the piston adjacent the closed end of the cylinder and the other end of said plunger being adapted for pressing to force the piston toward the bottom wall, the piston having puncturing means extending longitudinally therefrom and adapted to puncture the bottom wall of said cylinder so as to prevent reuse, and an annular protrusion extending beyond the bottom wall of the cylinder and integral therewith and having such dimensions as to prevent the user's fingers from being pricked by the puncturing means extending through the bottom wall of the cylinder, said needle extending a sufficient distance beyond said annular protrusion to permit insertion of said needle in said patient, and which includes a cover plate for the opening at the forward end of the annular protrusion, said cover plate having a centrally disposed opening, said injection needle having a diameter less than the inner diameter of said opening in said cover plate and passing through said opening.

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## 4,391,274
## FILTERED HUB DEVICE FOR ASPIRATING AND INJECTING LIQUIDS

Jonathan Kagan, Fairview, Pa., assignor to Becton, Dickinson and Company, Paramus, N.J.

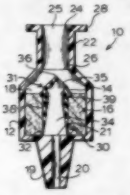
Filed Jun. 26, 1981, Ser. No. 277,475
Int. Cl.³ A61M 5/00
U.S. Cl. 604—190 1 Claim

1. A hub device for use in aspirating and injecting liquids comprising:

a housing having a chamber therein, a first opening for aspirating liquid into the chamber and for injecting liquid out of the chamber and a second opening extending through a mouth portion which is adapted to connect to a mating portion of a liquid movement device which serves as a driving force for aspirating liquid into and injecting liquid out of said device, said openings being located on opposite sides of said housing in substantially axial alignment with each other;

a tubular valve in said chamber having a flexible, operable closure element on opposite ends thereof; and

a filter in said chamber adapted to filter particulate matter from liquids passing therethrough, said filter also serving as a support member to maintain said valve in position in said chamber, said filter surrounding said valve including the first operable closure element thereof, said first element of said valve being positioned directly over said first opening and normally closing radially outwardly against said surrounding filter in an orientation substantially parallel to the axial alignment of said openings so that the interior of said tubular valve is in liquid communication



with said first opening whereby liquid flowing through said first opening during aspiration is directed through said tubular member, said first element adapted to flexibly move away from said filter to thereby open and place said first opening in liquid communication with the chamber exterior to said tubular valve during injection of liquid into the chamber through said second opening, said second element including an operable slot adapted to open during aspiration of liquid inwardly through said first opening and normally close under static conditions and remain closed upon injection of liquid into said chamber through said second opening.

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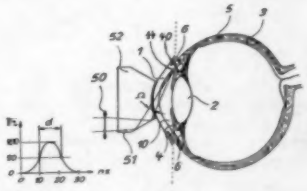
## 4,391,275
## METHOD FOR THE SURGICAL TREATMENT OF THE EYE

Franz Fankhauser; Eugen van der Zypen, both of Bern, and Philippe Roussel, Thun, all of Switzerland, assignors to Lasag AG, Thun, Switzerland

Filed Nov. 28, 1980, Ser. No. 211,202
Claims priority, application Switzerland, Nov. 28, 1979, 10570/79; France, Mar. 5, 1980, 80 04994
Int. Cl.³ A61B 17/36
U.S. Cl. 128—303.1 13 Claims



1. For a method of non-invasive surgical treatment of the eye which comprises the steps of

forming a convergent treatment laser beam,

directing the focus of the convergent treatment laser beam onto the structure to be treated,

shifting the focus with respect to the structure to be a certain distance in front of or behind the structure,

delivering the treatment laser beam into said focus where the radiation intensity performs the surgery,

an improvement to prevent damage to the structure of the eye not being treated, the improvement comprising the steps of:

generating visible ancillary lower power laser observation

beams to sense the outside envelope of the treatment laser beam,

rotating said laser observation beams around the optical axis of said laser treatment beam, said laser observation beams intersecting in the focus position of the laser treatment beam,

shifting the focus position of the treatment beam along the optical axis with respect to the intersection point of said laser observation beams,

directing the laser observation beams onto treatment point of the structure to be irradiated so that they intersect said structure and provide dots of light thereon for observation purposes,

inspecting the path of the observation laser beams to determine if the treatment beam on its pass into the focus will touch eye structure not being treated,

adjusting the treatment laser beam in accordance with the results of the inspection step to ensure that the treatment beam does not touch structures not to be treated, and

delivering the treatment laser beam into the focus to cause the surgery.

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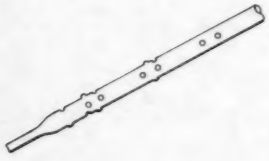
**4,391,276**

**PERITONEAL CATHETER**

**Harrison Lazarus, 1474 Penrose Dr., Salt Lake City, Utah 84103, and James A. Nelson, 1708 Forest Hills Dr., Salt Lake City, Utah 84106**

**Filed Dec. 16, 1980, Ser. No. 217,127**
**Int. Cl.³ A61M *25/00***
**U.S. Cl. 604—266** **5 Claims**



**1.** A catheter comprising:

a thin-walled, hollow-bore tubular member having an opening on an extraction end, said tubular member having a hollow-bore diameter of from about 1.0 to about 3.5 millimeters and an external diameter of from about 2.0 to about 4.0 millimeters;

a plurality of sidewall openings in said tubular member, said openings having protrusions associated therewith protruding from the exterior sidewall, at least a substantial portion of said protrusions being longitudinally aligned with a substantial portion of said sidewall openings, said sidewall openings having a diameter of from about 0.01 to about 2.0 millimeters and said sidewall protrusions project from about 0.01 to about 1.0 millimeter from the exterior wall surface.

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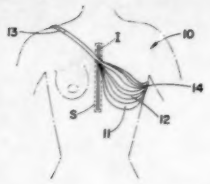
**4,391,277**

**BREAST SUPPORT**

**Marian L. Horvat, 3811 W. Pleasant Valley Rd., Parma, Ohio 44134**

**Filed Mar. 6, 1981, Ser. No. 238,880**
**Int. Cl.³ A41C *3/00***
**U.S. Cl. 128—492** **4 Claims**

**1.** A breast support comprising a long narrow cloth strip, said cloth strip having a middle pleated portion which is adapted for expanding open into a cup for automatically adjusting to any breast size, and means for adjusting said strip to various lengths, said middle pleated portion adapted for expanding into a cup at one end near a vertical wound in the middle of the chest of the user for supporting the breast in a first mode when the breast is positioned there from gravity and said opposite end of the pleated portion being closed, and said middle pleated portion being adapted for expanding into a cup




at the other end away from said vertical chest wound for supporting the breast in a second mode when the breast is positioned there from gravity and said opposite end of said pleated portion being closed.

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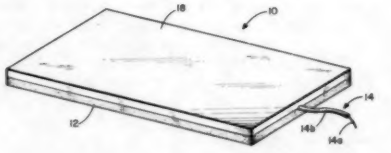
**4,391,278**

**TAPE ELECTRODE**

**Patrick T. Cahalan, Champlin, and Arthur J. Coury, St. Paul, both of Minn., assignors to Medtronic, Inc., Minneapolis, Minn.**

**Continuation-in-part of Ser. No. 968,489, Dec. 11, 1978, abandoned. This application Feb. 14, 1980, Ser. No. 121,387**
**Int. Cl.³ A61B *5/04***
**U.S. Cl. 128—640** **15 Claims**




**1.** A skin electrode consisting essentially of:

an adhesive electrically conductive skin-contacting member consisting essentially of a polymer component selected from the group consisting of polymerized 2-acrylamido-2-methylpropanesulfonic acid, its salts, copolymers of the acid, copolymers of the salts of the acid, and mixtures thereof, and a second component selected from the group consisting of water, alcohols and mixtures thereof, sufficient relative amounts of the polymer component and the second component being included to provide adhesiveness and flexibility to the member, and

electrical contact means connected to the conductive member for establishing electrical contact therewith.

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**4,391,279**

**ELECTRODE BELT**

**Israel M. Stein, Brookline, Mass., assignor to Clinical Data, Inc., Brookline, Mass.**

**Filed Dec. 11, 1981, Ser. No. 329,646**
**Int. Cl.³ A61B *5/04***
**U.S. Cl. 128—643** **8 Claims**

**1.** An electrode belt which comprises a belt of soft pliable material, a sheet of conductive, flexible, compliant, impervious material providing an electrode pad having opposite surfaces, one of which is disposed upon said belt and the other against the wearer when the belt is on the wearer, a fastener of conductive material having opposed plates disposed in clamping relationship with said pad and belt therebetween to form a

depression in said pad of cup shape to provide a suction area between the skin of the wearer, the pad and one of said plates,

said fastener having means providing an attachment for an electrode lead.

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**4,391,280**

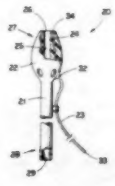
## ENEMA APPARATA IMPROVEMENTS RELATING TO DOUBLE CONTRAST STUDIES

**Roscoe E. Miller, 7400 W. 88th St., Indianapolis, Ind. 46278**

**Division of Ser. No. 131,965, Apr. 4, 1980, Pat. No. 4,333,460, which is a continuation-in-part of Ser. No. 39,502, May 16, 1979, abandoned. This application Nov. 30, 1981, Ser. No. 326,015**

**Int. Cl.³ A61B** *5/00*

**U.S. Cl. 128—654** **1 Claim**




1. An enema-administering apparatus insertable into the rectum for delivery of a contrast medium to internal portions of a patient's anatomy, for the subsequent removal of said contrast medium, and for the delivery of air to said internal portions of the anatomy after the contrast medium has been removed, said enema-administering apparatus comprising:

a generally tubular stem having a free end, an opposite insertable end and a first contrast medium passageway extending therethrough from a contrast medium inject location adjacent said free end to a contrast medium discharge location adjacent said insertable end, said tubular stem further having a first air passageway disposed completely external of said first contrast medium passageway, said first air passageway extending through said tubular stem from an air inject location adjacent said free end to an air discharge location adjacent said insertable end;

an enlarged hollow tip cooperatively arranged with said stem and disposed adjacent said insertable end, said hollow tip having a contrast medium exit aperture disposed therein and defining a second contrast medium passageway arranged in flow communication with and disposed between said first contrast medium passageway and said contrast medium exit aperture, said tip further having an air delivery outlet opening disposed therein and defining a second air passageway which is disposed completely external of said second contrast medium passageway and arranged in flow communication with and disposed between said first air passageway and said air delivery outlet opening;

said air delivery outlet opening is spaced apart from said contrast medium exit aperture so as to avoid the entry of said contrast medium into said second air passageway.

**4,391,281**

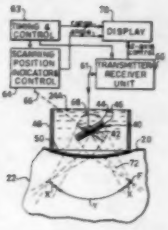
## ULTRASONIC TRANSDUCER SYSTEM AND METHOD

**Philip S. Green, Atherton, Calif., assignor to SRI International, Menlo Park, Calif.**

**Filed Jan. 6, 1977, Ser. No. 757,132**

**Int. Cl.³ A61B** *10/00*

**U.S. Cl. 128—660** **13 Claims**




1. A medical ultrasonic system for the non-invasive examination of a soft tissue region within a subject's body comprising,

focusing transducer means,

a container for said focusing transducer means having a liquid tight acoustically transparent rigid diaphragm for acoustically coupling directly to the subject's skin,

sonic coupling liquid within the container for acoustically coupling the focusing transducer means to said diaphragm,

pulse operated transmitter/receiver means connected to said transducer means for energization of said transducer means for producing ultrasonic waves which are coupled to the subject's skin through said coupling liquid and diaphragm and for processing electrical signals produced by said transducer means upon receipt of ultrasonic waves reflected from discontinuities within the tissue of the subject, and

indicating means for the display of echo signals received from discontinuities within the subject's body,

the material of said coupling liquid being selected so that the velocity of propagation of acoustic waves therein is substantially less than the velocity of propagation of acoustic waves in said soft tissue,

the acoustic path between the transducer means and diaphragm being substantially less than the maximum distance in soft tissue within the subject's body from which echo signals are received and displayed without interference by display of multiple reflections from the diaphragm.

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**4,391,282**

## COELIAC CAVITY ULTRASONIC DIAGNOSIS APPARATUS

**Otaro Ando, Hino, and Toshitaka Suwaki, Hachioji, both of Japan, assignors to Olympus Optical Company Limited, Tokyo, Japan**

**Filed Oct. 17, 1980, Ser. No. 198,246**

**Claims priority, application Japan, Oct. 24, 1979, 54-136442; Oct. 24, 1979, 54-136443; Sep. 12, 1980, 55-126966**

**Int. Cl.³ A61B** *5/02*

**U.S. Cl. 128—660** **22 Claims**

1. A coeliac cavity ultrasonic diagnosis apparatus including a scanner portion insertable into a physical body of a patient and operative to effect a B-mode sector scan of an ultrasonic wave to produce a tomographic image, comprising

(a) an endoscope including at least an observation means and illumination means and provided at its side surface near the distal end portion thereof with an opening;

(b) an ultrasonic signal transducer fixed to the distal end portion of the endoscope for generating and transmitting ultrasonic wave radiation in a direction substantially

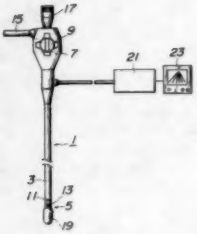
aligned with the axial direction of an insertable portion of said endoscope;

(c) a reflecting mirror opposed to and inclined at substantially a constant angle with respect to the ultrasonic wave radiation surface of the ultrasonic signal transducer and rotatably mounted at the opening provided at the distal end portion of said endoscope;

(d) a power means provided in an operating portion located in the rear of said endoscope and operative to rotate said reflecting mirror;

(e) a flexible shaft extending through a flexible portion of said endoscope and transmitting the rotation of said power means to said reflecting mirror;

(f) an initial pulse generating means rotatable together with said reflecting mirror at the distal end portion of said endoscope to generate a pulse just prior to the arrival of said reflecting mirror at a given position so as to define a display starting point at every ultrasonic scanning frame;




(g) an angle detecting means arranged in said operating portion located in the rear of said endoscope and rotatable in synchronism with said rotary shaft of said power means to detect the rotary angle of said power means and generate a pulse each time said rotary shaft rotates by a constant angle;

(h) means for obtaining a reflecting signal for reproducing an ultrasonic image from a pulse delivered from said initial pulse generating means and from a pulse delivered from said angle detecting means;

(i) a brightness modulating means operative to transmit the ultrasonic wave to said ultrasonic signal transducer and receive the ultrasonic wave therefrom to effect brightness modulation of the signal received; and

(j) means for displaying the ultrasonic image from said deflecting signal and brightness modulating signal.

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**4,391,283**

**INCENTIVE SPIROMETER**

**Edward N. Sharpless, Somerville; Marvin Gordon, East Winsor, and Joseph Lichtenstein, Colonia, all of N.J., assignors to Whitman Medical Corporation, Clark, N.J.**

**Filed Mar. 24, 1981, Ser. No. 247,097**

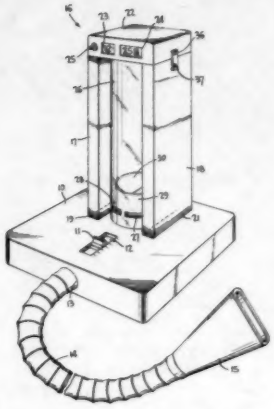
**Int. Cl.³ A61B *5/08***

**U.S. Cl. 128—725** **29 Claims**

1. An incentive spirometer comprising:

a flow path through which a patient can inhale air;

means responsive to air flow in said flow path for providing a visually-perceptible incentive indication for the patient; and




inhibiting means responsive to inhalation suction force above a predetermined force for inhibiting said incentive indication.

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**4,391,284**

**USE IN MODIFYING SMOKING TOBACCO AROMA AND FLAVOR OR MONO-OXOMETHYL SUBSTITUTED POLYHYDRODIMETHANONAPHTHALENE DERIVATIVES**

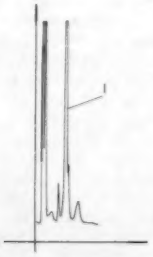
**Mark A. Sprecker, Sea Bright; Marie R. Hanna, Hazlet; Richard J. Tokarzewski, Keyport; Robert P. Belko, Woodbridge; Hugh Watkins, Lincroft, and Manfred H. Vock, Locust, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.**

**Filed Mar. 2, 1982, Ser. No. 354,387**

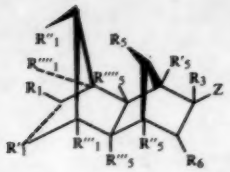
**Int. Cl.³ A24B *3/12, 15/30***

**U.S. Cl. 131—276** **10 Claims**

GLC PROFILE FOR EXAMPLE I.




1. A process for augmenting or enhancing the aroma or taste of a consumable material selected from the group consisting of smoking tobacco compositions and smoking tobacco articles comprising the step of adding to said consumable material an aroma or taste augmenting or enhancing quantity of at least one compound defined according to the structure:

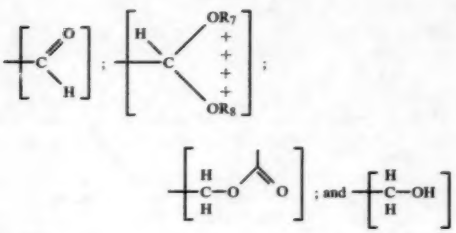


wherein the dashed line represents a carbon-carbon double bond or a carbon-carbon single bond; wherein $R_1$, $R_1'$, $R_1''$, $R_1'''$, $R_1''''$, $R_3$, $R_5$, $R_5'$, $R_5''$, $R_5'''$, $R_5''''$ and $R_6$ represent hydrogen or methyl; with the provisos:

(i) at least four of $R_1$, $R_1'$, $R_1''$, $R_1'''$ and $R_1''''$ represents hydrogen; and

(ii) at least four of $R_5$, $R_5'$, $R_5''$, $R_5'''$, $R_5''''$ represent hydrogen;

with Z being a moiety selected from the group consisting of:



with the line:

[++++]

representing a carbon-carbon single bond or no bond at all; and $R_7$ and $R_8$ being separately $C_1$–$C_4$ lower alkyl or, taken together, being $C_2$–$C_4$ alkylene.

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**4,391,285**

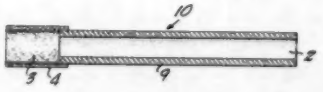
## SMOKING ARTICLE

**George H. Burnett, Richmond; Warren E. Claflin, Bon Air; Harry V. Lanzillotti, Midlothian; A. Clifton Lilly, Jr., Richmond; John F. Nienow, Midlothian; Thomas S. Osdene, and Alline R. Wayte, both of Richmond, all of Va., assignors to Philip Morris, Incorporated, New York, N.Y.**

**Filed May 9, 1980, Ser. No. 148,124**

**Int. Cl.³ A24B *3/14*; A24F *1/00, 5/00***

**U.S. Cl. 131—364** **27 Claims**



**1.** A smoking article comprising a coherent mass of combustible tobacco-containing material, said mass having at least one through passage extending from a first opening in the surface of said mass to a second opening remote from the first, said mass having a porosity such as to support combustion of said mass when ignited, said mass being of a density and porosity such as to substantially occlude gas flow therethrough, thereby providing that puff induced air flow through the smoking article is through the passage and said mass further being of a density, porosity and cross-sectional surface area such as to produce from 0.1 mg to 0.3 mg of tar per puff.

**4,391,286**

## HAIR CONDITIONING AND COMPOSITION THEREFOR

**Du Y. Hsiung, Park Forest; Chester A. Davis, Berwyn, and Harold J. Nicholson, Roselle, all of Ill., assignors to Helene Curtis Industries, Chicago, Ill.**

**Filed Feb. 19, 1981, Ser. No. 236,127**

**Int. Cl.³ A45D *7/00***

**U.S. Cl. 132—7** **16 Claims**

**1.** A composition for conditioning hair comprising water having dissolved therein about 0.05 to about 5 weight percent of a quaternary nitrogen-containing polymer having a molecular weight between about 10,000 and about 10,000,000 and about 0.5 to about 10 weight percent of a water-soluble, disulfide-containing polycarboxylic acid or salt thereof, said composition having a pH value at 80° F. from about 4 to about 9.

**9.** A process for treating hair whose configuration is to be altered including the steps of:

applying the composition of claim **1** to the hair;

distributing said composition substantially evenly throughout said hair; and

altering the configuration of the hair while the hair is at least partially damp.

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**4,391,287**

## CLEANING APPARATUS FOR ENDOSCOPE

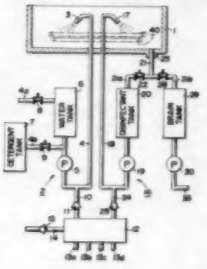
**Katunaga Konoshima, Hachioji, Japan, assignor to Olympus Optical Company Ltd., Japan**

**Filed Mar. 5, 1981, Ser. No. 240,951**

**Claims priority, application Japan, Apr. 11, 1980, 55-47862**

**Int. Cl.³ B08H *3/12***

**U.S. Cl. 134—99** **11 Claims**



**1.** A cleaning apparatus for an endoscope, comprising:

a cleaning vessel; a cleaning liquid supply mechanism for supplying a cleaning liquid including liquid detergent or the like to the cleaning vessel in which an endoscope to be cleaned may be disposed;

a drain pipe connected to the cleaning vessel and through which the cleaning liquid may be drained after it has been supplied to the cleaning vessel;

a liquid disinfectant circulating mechanism for supplying a liquid disinfectant including a tank for containing the disinfectant and being connected to the cleaning vessel to supply disinfectant to disinfect the endoscope after the cleaning liquid has been drained from the cleaning vessel, and the drain pipe being connectable to the tank for returning the liquid disinfectant from the cleaning vessel to the tank via the drain pipe, whereby residue detergent is mixed with the disinfectant as the disinfectant passes through the drain pipe; and

means disposed within the liquid disinfectant circulating mechanism for supplying an anti-foaming agent therethrough which is effective to prevent a foaming from occurring in the presence of any residue of detergent which has mixed with the disinfectant.

## 4,391,288
## METHOD AND A DEVICE FOR EFFECTING RINSING OF AN INVERTED SIPHON, WHICH FORMS PART OF A SEWER

Gösta Nilsson, Aratorpsvägen 38, Fritsla, Sweden (510 20)

PCT No. PCT/SE80/00163, § 371 Date Feb. 11, 1981, § 102(e) Date Feb. 9, 1981, PCT Pub. No. WO80/02855, PCT Pub. Date Dec. 24, 1980
PCT Filed Jun. 10, 1980, Ser. No. 237,143
Claims priority, application Sweden, Jun. 11, 1979, 7905094
Int. Cl.³ E03D 1/00; B08B 3/02
U.S. Cl. 137—15 10 Claims

1. A method for effecting rinsing of an inverted siphon which forms part of a sewer by interconnecting two separated sections of a sewer line comprising, arranging upstream of the inverted siphon a fluid reservoir having a volume which at least corresponds to the volume of the siphon for the length thereof requiring rinsing, and at least once every twenty-four hours applying a jet force in said siphon to cause the fluid contents of the reservoir to flow through the inverted siphon with a flow velocity which at least corresponds to the rinsing velocity required for removing sludge which has accumulated in the inverted siphon.

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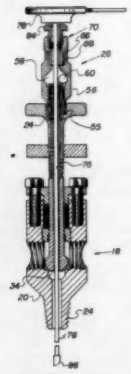
## 4,391,289
## CHECK VALVE FOR ROD OUT

Donald L. Adams, P.O. Box T, Tulia, Tex. 79088

Filed May 18, 1981, Ser. No. 264,578
Int. Cl.³ B08B 1/02; F16K 51/00
U.S. Cl. 137—15 14 Claims



1. The process involving an opening such as a nozzle with a duct extending to the opening with the duct being closed by a main valve, wherein the improved method comprises:

a. cleaning debris from the duct and the opening below the main valve by

b. inserting a rod through a check valve on the distal end of the duct, through the main valve while the main valve is closed and through the duct,

c. opening and unseating the check valve with said rod,

d. mounting a packing gland upon said rod, and

e. attaching said packing gland to the check valve before inserting the rod through the check valve and before unseating the check valve.

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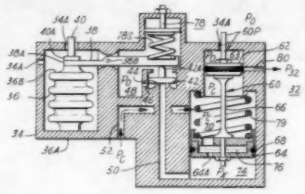
## 4,391,290
## ALTITUDE SENSING CONTROL APPARATUS FOR A GAS TURBINE ENGINE

Raymond L. Williams, Evendale, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Oct. 23, 1980, Ser. No. 200,221
Int. Cl.³ F16K 31/12, 49/00, 37/00
U.S. Cl. 137—81.1 6 Claims



1. Altitude sensing control apparatus for a gas turbine engine of the type including a compressor section which receives an input airflow and develops a pressurized output airflow, which comprises:

(a) means coupled to ambient air for developing a first pneumatic signal representative of ambient air pressure;

(b) means coupled to said compressor section for receiving a portion of said pressurized output airflow and developing a second pneumatic signal representative of said pressurized output airflow; and

(c) pneumatic valve switching means for receiving said first and second pneumatic signals and developing a control apparatus pneumatic output signal in which said pneumatic valve switching means includes a first stage having a poppet valve for driving a second stage, including a drive piston, said piston being driven in a first direction for ambient air pressures greater than said predetermined value and being driven in a second opposing direction for ambient air pressures less than said predetermined value, said piston second stage including an output port, said pneumatic output signal at said output port comprising said first pneumatic signal when said piston is driven in the first direction and comprising said second pneumatic signal when said piston is driven in the second direction, said poppet valve being coupled to a bellows through a medially pivotable connecting link, said piston including a pair of opposing head portions separated by a rod portion and being sealingly located in said housing, a first region being defined between one of the opposing head portions of said piston and said housing, a second region being defined between said opposing head portions of said housing and a third region being defined between the other opposing head portion of said housing, wherein said second region is coupled to receive said second pneumatic signal, said first region is coupled to receive said first pneumatic signal, said third region is coupled through said poppet valve to a region in said housing at ambient air pressure, said one opposing head portion including a servo orifice therethrough coupling said second region to said third region with said third region developing a third pneumatic signal representative of a servo pressure for controlling the movement of said piston, wherein:

(i) said pneumatic output signal comprises said first pneumatic signal for ambient air pressures greater than a predetermined value which is representative of a predetermined altitude, and

(ii) said pneumatic output signal comprises said second

pneumatic signal for ambient air pressures less than said predetermined value.

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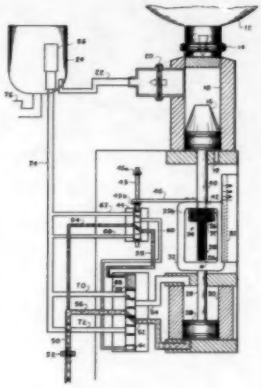
## 4,391,291
## APPARATUS FOR RECONSTITUTING A CONCENTRATE

**Ronald W. Hume, 848 Harbor Island, Clearwater, Fla. 33515**

**Filed Feb. 24, 1981, Ser. No. 237,757**
**Int. Cl.³ F16K *19/00***
**U.S. Cl. 137—99** **8 Claims**



**1.** An apparatus of the type designed to reconstitute a liquid concentrate, said apparatus including a first reservoir for storing the concentrate and a second reservoir for storing the reconstituted concentrate, and said apparatus further comprising, in combination,

a pumping means operable to transfer predetermined amounts of concentrate from said first reservoir to said second reservoir,

said pumping means including a first piston means carried by a first piston rod means,

a motor means operable to deliver predetermined amounts of a reconstituting fluid to said second reservoir,

said motor means including a second piston means carried by a second piston rod means,

a yoking means for interconnecting said motor means in driving relation to said pumping means,

said first and second piston rod means disposed in axial alignment with one another and operably interconnected to one another through said yoking means,

a pair of multi-port, bi-directional valve means for operably interconnecting an external source of fluid under pressure in driving relation to said motor means,

said pair of valve means operably interconnected to one another so that one of said pair is a driving valve and the other of said pair is a driven valve,

said driving valve being operably interconnected to said yoking means so that the position of said yoking means determines the opening and closing of the ports of said driving valve,

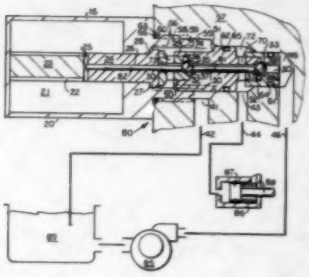
said first piston rod means having a reduced diameter portion to provide a shoulder means between the reduced and un-reduced portions of said first piston rod means,

said yoking means provided with an aperture means for receiving only the reduced diameter portion of said first piston rod means so that travel of said first piston rod means in a first direction toward said yoking means displaces and yoking means by abutting a leading portion of said yoking means, but travel of said first piston rod means in a second direction away from said yoking means does not displace said yoking means.

## 4,391,292
## FAST-RESPONSE THREE-WAY SOLENOID VALVE

**Robert W. Millar, San Diego, Calif., assignor to Orshansky Transmission Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 159,469, Jun. 16, 1980, abandoned. This application Jul. 28, 1980, Ser. No. 172,661**
**Int. Cl.³ F15B *13/044***
**U.S. Cl. 137—269** **21 Claims**



**19.** A fast-response three-way solenoid valve, comprising:

a housing having a first opening, a secnd opening, and a third opening interconnected by a linear fluid pathway,

a first chamber disposed in said pathway between said first opening and said second opening, each end of said first chamber forming a first valve seat, one an inner valve seat and one an outer valve seat, with respect to said second opening,

a first ball in said first chamber movable toward and away from a said first valve seat to open and to close off the flow of fluid through the pathway at said first valve seat,

a second chamber disposed in said pathway in line with said first chamber and between said second opening and said third opening, each end of said second chamber forming a second valve seat, one an inner valve seat and one an outer valve seat, with respect to said second opening,

a second ball in said second chamber movable toward and away from a said second valve seat to open and to close off the flow of fluid through the pathway at that said second valve seat,

a separator pin disposed, with clearance, within said linear pathway between said first and second chambers and bearing against both said first and second balls at substantially all times, said valve seats, balls, and separator pin being so related that when one said ball is seated against its said seat the other ball is not seated by said separator pin,

a solenoid having a coil, a plunger which moves upon energization of the solenoid, and a guide passage between said plunger and said first chamber, aligned with both said first and second chambers and said first and second balls,

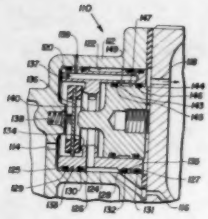
a plunger pin disposed in said guide passage, one end of said plunger pin bearing against said first ball on the side thereof opposite to said separator pin, the other end of said plunger pin bearing against said plunger when said solenoid is energized,

movement of said plunger upon the energization of said solenoid causing said plunger to contact and move said plunger pin, in turn moving said first ball, said separator pin, and said second ball so that one of said balls is seated against the said seat when the solenoid is energized and the other ball is seated against its said seat when the solenoid is de-energized.

## 4,391,293
## PACKING FOR EQUALIZING RESERVOIR CUT-OUT VALVE

John R. Keenan, Watertown, N.Y., assignor to General Signal Corp., Stamford, Conn.

Filed Dec. 18, 1980, Ser. No. 217,872
Int. Cl.³ F16K 51/00, 31/122
U.S. Cl. 137—312 15 Claims



1. In a valve having a housing, a bore in said housing, a valve seat in said bore, a first packing means providing a seal between said valve seat and said housing, said first packing means being subjected to differential pressure reversals across that packing means, the improvement comprising:

a second, separate packing means spaced from said first packing means and adjacent thereto between said valve seat and said housing and providing a seal between said valve seat and said housing; and

means for eliminating differential pressure reversals across said first and second packing means when said valve experiences differential pressure reversals therein by connecting the space between said first and second packing means to a fixed value of pressure such that said first and second packing means do not oscillate in response to said differential pressure reversals.

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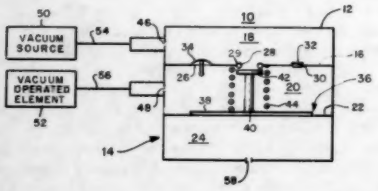
## 4,391,294
## DUMP DELAY VALVE

John A. Aubel, Decatur, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Nov. 30, 1981, Ser. No. 326,231
Int. Cl.³ F16K 17/18; F02M 3/00
U.S. Cl. 137—493.8 13 Claims




1. A dump delay valve, comprising:

a wall structure defining an enclosure,

a separating plate mounted in said enclosure, defining an input chamber and an output chamber, which separating plate defines a port, an aperture and an umbrella valve opening between the input and output chambers,

an umbrella valve mounted in said input chamber on the separating plate, to cover said umbrella valve opening,

a diaphragm operator, mounted in the output chamber defining a third chamber, with the output chamber adjacent the separating plate, which diaphragm operator separates and seals the output and third chambers from each other,

a mounting plate affixed to the diaphragm operator in said output chamber,

said wall structure defining an input port for the input chamber, an output port for the output chamber, and an aperture to communicate said third chamber to atmosphere,

a stem positioned in the output chamber, which stem is affixed to said mounting plate and operable by the diaphragm operator,

a seal means affixed near one end of the stem and positioned to abut said separating plate port, and

a bias spring with a known bias force, positioned in the output chamber to bias the diaphragm operator and stem to open the separating plate port when the pressure difference between the output and third chambers is less than the bias force of the spring.

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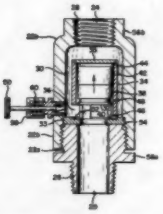
## 4,391,295
## HOT WATER SYSTEM AND VALVE

Lester E. Stipe, Portland, Oreg., assignor to Precision Plumbing Products, Inc., Portland, Oreg.

Filed Dec. 14, 1981, Ser. No. 330,263
Int. Cl.³ F24H 1/00
U.S. Cl. 137—522 3 Claims



1. A gravity operated valve comprising:

(a) a valve casing comprised of lower and upper sections secured together detachably, the lower section having an inlet fluid passage and the upper section having an outlet fluid passage and a vertically elongated communication passage communicating the outlet passage with the inlet passage,

(b) a valve seat ring secured removably between the lower and upper valve casing sections and having an upwardly facing annular valve seat facing said communication passage,

(c) a hollow vertically elongated cylinder secured to said valve seat ring outwardly of the annular valve seat and extending vertically upward into said communication passage, the cylinder having a cylinder wall having an outer diameter substantially smaller than the diameter of the communication passage, the cylinder having a closed top and an open bottom communicating with the valve seat ring opening, the cylinder wall having an opening therethrough adjacent the valve seat ring,

(d) a weighted piston slidably fitted within said cylinder for vertical movement therein, said piston defining an upper cavity within said cylinder above said piston, said piston having a valve face on the bottom thereof for sealingly fitting on the upwardly facing valve seat on the valve seat ring when the fluid pressures at said inlet passage and said outlet passage are in substantial equilibrium, said piston being free to rise off said valve seat toward the closed top of said cylinder when the fluid pressure at said inlet passage is greater than the fluid pressure at said outlet passage, and

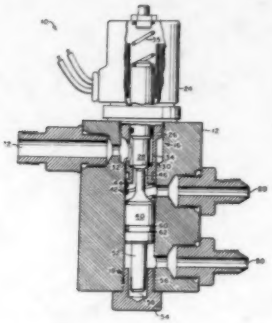
(e) a flow limiting passage communicating the communication passage in the upper valve casing section with said upper cavity in the cylinder for dampening the speed of movement of the piston in the cylinder.

**4,391,296**

## BY-PASS PILOT OPERATED HYDRAULIC CHECK VALVE

**John D. Abbott, 26395 S. Corral Hollow Rd., Tracy, Calif. 95395**

**Filed May 7, 1981, Ser. No. 261,458**
**Int. Cl.³ F16K** *17/32, 31/06*
**U.S. Cl. 137—523** **4 Claims**



1. A valve comprising

means defining a housing,

means defining a main bore in said housing having a first end and a second end,

means defining an inlet port in fluid communication with said first end of said main bore,

means defining an outlet port in fluid communication with said first end of said main bore,

a solenoid valve having a valve plug and a valve seat disposed in said main bore between said inlet port and said outlet port, said plug of said solenoid valve biased against said seat of said solenoid valve when said solenoid valve is unenergized,

means defining a second fluid flow channel in fluid communication with said second end of said main bore,

a piston disposed in said main bore between said first and said second ends,

means for applying hydraulic fluid pressure in said second channel whereby said piston moves toward and engages said solenoid valve plug and moves said plug away from said seat to permit the flow of fluid from said inlet port to said outlet port, and

means for decelerating said piston when said piston moves away from said solenoid valve plug upon release of said hydraulic fluid pressure in said second channel.

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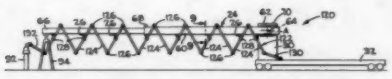
**4,391,297**

## MONO-RAIL BOOM SUPPORTED ARTICULATED SERVICE LINE

**Houston W. Knight, Whittier, Calif., assignor to FMC Corporation, Chicago, Ill.**

**Filed Nov. 20, 1980, Ser. No. 208,767**
**Int. Cl.³ F16L** *3/00*
**U.S. Cl. 137—615** **20 Claims**



1. A mono-rail boom supported articulated well service line for use in well service operations to interconnect a supply of pressurized fluid to a wellhead, comprising:

an extendible mono-rail boom having a plurality of boom sections with an inboard boom section mounted on a mobile transport means and with the other boom sections extendible outward from said inboard boom sections;

means for supporting an outer portion of said boom when said boom is in an extended position;

an articulated pipe well service line;

a plurality of trolleys mounted for relative independent movement along the length of said boom with the movement of said trolleys independent of the extendible movement of said boom sections;

means for connecting said service line to said trolleys for movement of said service line between a retracted position and an extended position when said boom is in an extended position; and

means for disconnecting said service line from said trolleys for supporting said service line on the ground when said service line is at least partially extended.

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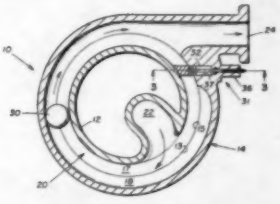
**4,391,298**

## MULTILINE PIGGABLE FLUID SWIVEL

**John E. Ortloff, Houston, Tex., assignor to Exxon Production Research Co., Houston, Tex.**

**Filed Dec. 31, 1980, Ser. No. 221,738**
**Int. Cl.³ F16L** *27/06*
**U.S. Cl. 137—615** **13 Claims**



1. A piggable fluid swivel comprising:

a first element having a first surface;

a second element rotatably mounted on said first element so that said first and second elements rotate with respect to one another about a common axis, said second element having a second surface which rotatably mates with said first surface of said first element;

a continuous fluid passage in said swivel defined by a first groove in said first surface and a second groove in said second surface which align opposite each other when said first and second elements are assembled;

seal means for preventing flow from said fluid passage between said first and second surfaces;

a first opening through said first element into said first groove to provide fluid communication between the exterior of said swivel and said fluid passage;

a second opening through said second element into said second groove to provide fluid communication between the exterior of said swivel and said fluid passage; and

fluid barrier means mounted on one of said elements for substantially blocking fluid flow in said continuous flow passage at the point of said barrier means, said fluid barrier means comprising:

a housing on said one of said elements having a recess therein which opens into said groove of said one of said elements;

a baffle plate slidably positioned in said recess and being movable between (a) an open position wherein said baffle plate is sufficiently retracted within said recess so that substantially no part of said baffle plate extends into said groove on said one of said elements and (b) a closed position wherein said baffle plate sufficiently extends from said recess into said other groove on said other element to substantially block fluid flow through said continuous passage past said baffle plate, said baffle plate movement occurring substantially along a straight line coinciding with the longitudinal axis of said baffle

plate, said baffle plate having a sealing edge conforming to a corresponding portion of said other groove on said other element, whereby in response to said baffle plate being in said closed position, said continuous fluid passage is substantially completely sealed from fluid flow past said baffle plate; and

means in said housing for moving said baffle plate back and forth between said open and closed positions.

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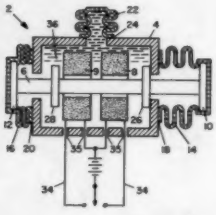
**4,391,299**

## ELECTRO FLUIDIC ACTUATOR

**Allen B. Holmes, Rockville, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Apr. 21, 1980, Ser. No. 142,547**
**Int. Cl.³ G01V *1/04***
**U.S. Cl. 137—831** **5 Claims**



1. An actuator for converting electrical signals into power pulses in a working fluid, comprising a sealed, fluid-tight enclosure, including:

a housing having a plurality of openings therein, and

a like plurality of lightweight, low inertia bellows having open end portions which adjoin the housing in intimate contact therewith and which are aligned respectively with the housing openings, opposite closed end portions having one side in contact with the working fluid, and intermediate side portions which are highly compliant to movement of the closed end portions relative to the opposite open end portions and adjoining housing, the plurality of bellows including first and second working bellows and a pressure equalizing bellows;

electromechanical means, connected within the sealed enclosure between the housing and the closed end of each working bellows, for moving the closed end of each working bellows relative to the housing in accordance with the electrical signals to generate corresponding power pulses in the working fluid adjacent each working bellows, said electromechanical means comprising

a movable shaft having one end connected to the closed end of the first bellows and an opposite end connected to the closed end of the second bellows,

a coil for urging said shaft in a first direction, and

a spring for urging said shaft in a second direction; and

pressure equalizing means for equalizing pressure within the housing with pressure of the working fluid in contact with the pressure equalizing bellows, including

an electrically non-conductive liquid which is disposed within and fills the sealed enclosure, and

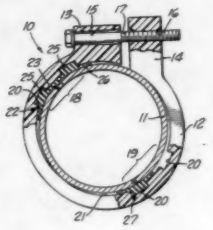
the pressure equalizing bellows, which serves as a freely movable interface between the non-conductive liquid within the housing and the working fluid in contact with the pressure equalizing bellows.

**4,391,300**

## PIPE PATCHING CLAMP

**Arthur D. Saylor, Covina, and Henry L. Habegger, Anaheim, both of Calif., assignors to Habegger International, Pasadena, Calif.**

**Filed Sep. 2, 1980, Ser. No. 182,942**
**Int. Cl.³ F16L *55/16***
**U.S. Cl. 138—99** **8 Claims**



1. A pipe patching clamp for repairing fissures in pipes in situ, comprising:

a one-piece non-metallic strap member formed into a cylinder and having a pair of dogs forming the respective opposite ends, said member being sufficiently resilient to enable separation of the member ends and receipt of the member about a pipe with inherent resiliency urging the strap member ends toward one another;

first and second longitudinally extending grooves on the member inner surface, the base of each groove and the groove opening at the strap member surface being of substantially same dimensions, said grooves being located at approximately 180 degrees to each other;

threaded means for securing the strap member dogs together and hold the strap member about the pipe; and

a sealing strip of a resilient material, one side of the strip curved to conform to the inner surface of said strap member and including at least one integral tongue of such geometry enabling fitting receipt within a groove, the other side of said strip extending outwardly of the inner surface of the strap member.

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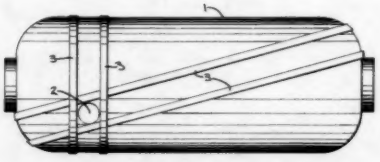
**4,391,301**

## HOLE REINFORCEMENT

**Fred R. Pflederer, Wauwatosa, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.**

**Filed Aug. 27, 1981, Ser. No. 296,809**
**Int. Cl.³ B65D *90/02*; F16L *9/16***
**U.S. Cl. 138—103** **2 Claims**



1. A structural article comprising:

a cylindrical wall having a longitudinal axis and formed of a cured thermosetting resin reinforced by fibrous material, said wall having an opening therein; and

a plurality of pairs of opening reinforcement bands, said bands comprising a series of continuous filaments encircling said wall and bonded to the outer surface of said wall, with said bands in each of said pairs being disposed

tangentially to the perimeter of said opening and on substantially opposite sides of said opening,

one of said pairs of bands disposed substantially normal to the longitudinal axis of said cylindrical wall and

at least one of said pairs of bands overlapping at least one other of said pairs of bands in the vicinity of said opening.

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**4,391,302**

**COUPLED TUBULAR CASING FOR FOODSTUFFS**

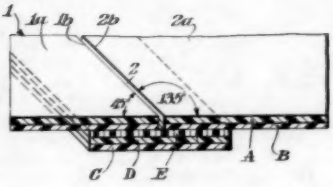
**Helmut Huhn, and Siegfried Kaiser, both of Walsrode, Fed. Rep. of Germany, assignors to Wolff Walsrode Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jan. 23, 1980, Ser. No. 114,655**

**Claims priority, application Fed. Rep. of Germany, Jan. 27, 1979, 2903117**

**Int. Cl.³ F16L *11/12***

**U.S. Cl. 138—118.1** **11 Claims**




1. A flexible shirrable coupled tubular casing for foodstuffs having a plurality of couplings the coupling seams of which are formed by adjacent ends of tubular casing portions to be coupled and a multilayered sealable foil, the adjacent ends of the tubular casing portions to be coupled each having a continuous circumferential edge portion which substantially lies in a plane extending at an oblique angle of 10° to 80° to the longitudinal axis of the tubular casing, and the foil placed in sealing engagement with and partially inside each of the adjacent ends of the tubular casing portions to be coupled and also extending at an oblique angle of 10° to 80° to the longitudinal axis of the tubular casing.

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**4,391,303**

**BAND-SHAPED DEVICE FOR FORMING A PIPE-SHAPED PROTECTION COVER**

**Stig L. Holgersson, Bredaryd, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden**

**PCT No. PCT/SE80/00126, § 371 Date Jan. 3, 1981, § 102(e) Date Dec. 23, 1980, PCT Pub. No. WO80/02476, PCT Pub. Date Nov. 13, 1980**

**PCT Filed Apr. 29, 1980, Ser. No. 227,066**

**Claims priority, application Sweden, May 3, 1979, 7903842**

**Int. Cl.³ F16L *57/00***

**U.S. Cl. 138—166** **6 Claims**

1. An article for forming a tubular, protective cover around a cable, said article comprising a generally flat band of material having opposite upper and lower surfaces and end edges, one of said surfaces being planar, the other surface being provided with a plurality of spaced grooves extending parallel to said end edges, each groove having inclined sides which intersect to form an apex proximate said one planar surface to form a hinge thereat where said band can be folded to enable the band to surround a cable, said other surface of said band being relatively flat between said grooves to define a continuous planar surface, said band including elevations projecting beyond the plane of said other surface in continuation of said sides of said grooves on both sides of each groove such that with the band folded at the hinges, the elevations at the both sides of the respective grooves approach one another to provide a stiffening effect for the folded band around the cable, and locking means on said band on said band proximate said end edges for holding the folded band around the cable, said material of the band being a soft, extruded plastic, the configu-

ration of said grooves and said elevations being such to enable said band to be wound into a roll.

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**4,391,304**

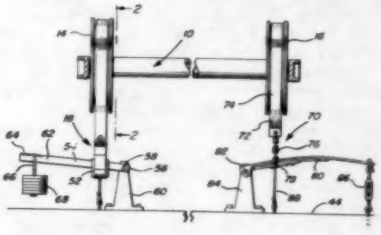
**WARP TENSION STRUCTURE**

**Ray M. Taylor, 1000 Park Ave., Quakertown, Pa. 18951, assignor to Ray A. Taylor, Quakertown, Pa.**

**Filed Apr. 16, 1981, Ser. No. 254,881**

**Int. Cl.³ D03D *49/04, 49/08*; F16D *63/00***

**U.S. Cl. 139—100** **8 Claims**




1. A tensioning mechanism for a loom warp beam wherein the beam includes at least one cylindrical head, said mechanism defining a band including a discontinuous inner gripping ply extending about said head and an outer tensioning ply secured to and extending about the inner ply and having adjacent opposite ends, one of said ends including roller means journaled therefrom for rotation about an axis disposed transverse to the longitudinal extent of said one end, an elongated flexible tension member having one end anchored relative to the other end of said tensioning ply and extending therefrom and about said roller means and thereafter generally tangentially of said roller means in a direction generally opposite to the direction in which said tension member extends from said tension ply one end toward said roller means, means non-yieldingly anchoring the other end of said tension member relative to the axis of rotation of said head, said one end of said outer tensioning ply being anchored to the corresponding end of said inner play, the other end of said outer ply extending from the side of said head opposite from the head side from which the other end of said tension member extends toward its anchored position relative to the axis of rotation of said head, said outer ply other end generally paralleling said tension member other end and variable force means oppositely connected to said other

end of said outer ply yieldingly biasing said other outer ply end in a direction in which it extends from said head.

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**4,391,305**

## WEFT PICKING DEVICE OF AIR JET TYPE WEAVING LOOM

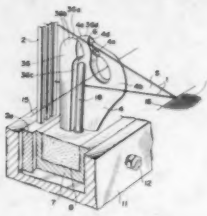
**Takao Takahashi, Hachioji, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed May 12, 1980, Ser. No. 149,083**

**Claims priority, application Japan, May 18, 1979, 54-61767; Oct. 19, 1979, 54-134242; Jan. 14, 1980, 55-2121**

**Int. Cl.³ D03D *47/30***

**U.S. Cl. 139—435** **15 Claims**



1. A weft picking device of an air jet type weaving loom, comprising:

(a) a weft inserting nozzle for injecting a weft yarn under the influence of an air jet therefrom to insert the weft yarn into the shed of warp yarns;

(b) a plurality of air guide members each having a generally looped section defining at the inner peripheral surface thereof an air guide opening, said loop section having a slit through which the weft yarn can leave said air guide opening, said air guide openings forming an air guide channel through which the weft yarn is picked into the warp yarn shed;

(c) an auxiliary nozzle in the shape of a pipe and having a nozzle opening through which an auxiliary air jet is ejected to enhance an air stream produced by the air jet from said weft inserting nozzle so as to assist weft picking, said nozzle opening of said auxiliary nozzle being so formed that the extension of the axis thereof intersects the axis of said air guide channel at a predetermined angle and is perpendicular to a tangent line of said air guide opening of one of said air guide members at a point on said inner peripheral surface of said loop section thereof; and

(d) means for pushing aside the warp yarns when said auxiliary nozzle enters the array of warp yarns, said pushing aside means being located in the vicinity of said auxiliary nozzle and the dents of a reed.

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**4,391,306**

## COIL WINDING APPARATUS

**Tokuhito Hamane, Hirakata; Toshio Kinoshita, Katano; Masafumi Kihira, Hyogo; Hitosi Hamada, Yawata, and Mikio Gotou, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Feb. 23, 1981, Ser. No. 237,403**

**Int. Cl.³ B21F *3/00***

**U.S. Cl. 140—92.1** **3 Claims**

1. A coil winding apparatus comprising:

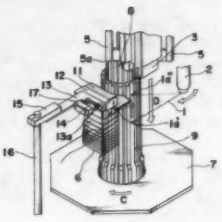
a coil winding spool on which coils are to be wound;

a flyer member for winding electric wire around said coil winding spool to form the coils;

a coil inserting jig which is positioned adjacent said spool member for receiving thereon coils formed on said spool member and rotatably supported for rotation with respect to said coil winding spool for having portions moved past said winding spool for receiving respective coils on the different portions of said winding spool;

coil depressing means movable past said winding spool toward said coil inserting jig for moving coils off said winding spool onto said coil receiving jig; and

a stop disposed beside said coil inserting jig and being reciprocally pivotable around an axis perpendicular to the



direction of movement of said coil depressing means only between a position in which it extends directly toward said coil inserting jig and a position in which it is pivoted away from said coil depressing means to leave space between said stop and said coil inserting jig for passage of a coil onto said coil inserting jig, whereby coils already accomodated on said coil inserting jig are prevented from moving past said stop toward said winding spool.

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**4,391,307**

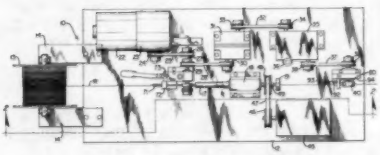
## WIRE STRAIGHTENING AND CUTTING MECHANISM

**George W. Levi, Littleton, and Kalman Kanyo, Westminster, both of Colo., assignors to G&D, Inc., Denver, Colo.**

**Filed Jan. 30, 1981, Ser. No. 229,781**

**Int. Cl.³ B21F *1/02***

**U.S. Cl. 140—140** **18 Claims**



1. In a wire straightening and cutting apparatus adapted to cut wire of varying lengths from a supply source having a continuous length of wire, wire feeding means for advancing said continuous length of wire in a lengthwise direction from said supply source, wire straightening means downstream of said feeding means through which said continuous length of wire is advanced, and guide means downstream of said wire straightening means to permit said continuous length of wire to float unrestrained from said wire straightening means, and a cutter mechanism including a cutter blade and rotary drive means for rotating said cutter blade in correlated relation to said wire feeding means including means to vary the speed of rotation of said cutter blade in relation to the rate of advancement of said wire as established by said feeding means in regulating the length of wire which is cut by said cutter blade.

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**4,391,308**

## SOAP DISPENSING SYSTEM

**Robert L. Steiner, Chicago, Ill., assignor to Steiner Corporation, Salt Lake City, Utah**

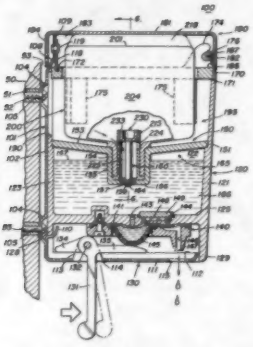
**Filed Apr. 16, 1981, Ser. No. 255,034**

**Int. Cl.³ B65B *3/04***

**U.S. Cl. 141—18** **49 Claims**

1. A system for dispensing liquid soap comprising a closed

wall structure defining a container, partition means separating said container into a lower liquid soap reservoir and an upper refill compartment, dispensing means carried by said container for dispensing liquid soap from said reservoir, a refill well having a refill aperture therethrough providing communication between said reservoir and said refill compartment and dimensioned to permit the free flow of liquid soap therethrough, a pusher member disposed in said refill well extending upwardly toward said upper refill compartment, a refill cartridge containing liquid soap and having an outlet, a tubular drain adaptor in said refill cartridge in sealing relation with said outlet providing communication through said tubular



drain adaptor between the inside and outside of said cartridge, and a stopper in said tubular drain adaptor slidable between a sealed position thereof wherein liquid in said refill cartridge is sealed therein and an open position thereof wherein said stopper is positioned away from said outlet to permit free flow of soap therefrom, said refill cartridge being removably enclosed within said refill compartment in a refill configuration with said outlet disposed for cooperation with said refill well, said pusher member sliding said stopper within said tubular drain adaptor to the open position thereof when said refill cartridge is in the refill configuration thereof to permit the free flow of liquid soap from said refill cartridge to said reservoir thereby to refill same.

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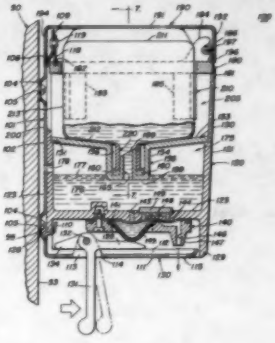
**4,391,309**

## SOAP DISPENSING SYSTEM

**Robert L. Steiner, Chicago, Ill., assignor to Steiner Corporation, Salt Lake City, Utah**

**Filed Apr. 16, 1981, Ser. No. 255,035**
**Int. Cl.³ B65B *3/04***
**U.S. Cl. 141—18** **35 Claims**

1. A system for dispensing liquid soap comprising a closed wall structure defining a container, partition means separating said container into a lower liquid soap reservoir and an upper refill compartment, dispensing means carried by said container for dispensing liquid soap from said reservoir, a refill aperture in said partition means providing communication between said reservoir and said refill compartment, a refill cartridge containing liquid soap and having an outlet, and slot and key mechanism carried by the end of said refill cartridge outlet and said container for maintaining said cartridge in a predetermined refill configuration and in communication with said refill aperture, said refill cartridge being removably enclosed within said refill compartment in a refill configuration with the end of said refill cartridge outlet disposed for cooperation with said refill



aperture to permit flow of liquid soap from said refill cartridge to said reservoir thereby to refill said reservoir.

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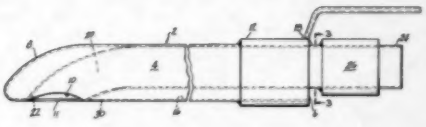
**4,391,310**

## BAG FILLER SPOUT

**J. George Lepisto, Middletown, Ohio, assignor to Champion International Corporation, Stamford, Conn.**

**Filed Sep. 22, 1981, Ser. No. 304,358**
**Int. Cl.³ B65B *1/18***
**U.S. Cl. 141—286** **3 Claims**



1. A filler spout for use in feeding a stream of flowable material into a closed end multi-wall bag to facilitate insertion of the spout into the bag without damaging the inner wall thereof, and to ensure a constant volume passage for exhaust from the bag as the bag is filled by the flowable material, said spout comprising:

(a) an outer tubular shroud member having a blunt curvilinear closed end and an opposite open end, an exhaust port formed in the side wall of the shroud member, and a discharge opening formed in the side wall of said shroud member intermediate said blunt curvilinear closed end and said exhaust port; and

(b) an open ended material delivery tube disposed within the bore of said shroud member and spaced from the wall thereof so as to define an exhaust passage, one end of said exhaust passage being in communication with said exhaust port and the other end of said exhaust passage opening to ambient surroundings through the open end of said shroud member, said delivery tube having an inlet end adapted for connection with a material impelling machine, and an outlet end disposed contiguous to said discharge opening of said shroud member, said inlet end of said delivery tube projecting outwardly beyond said open end of said shroud member, said delivery tube having a first straight line portion extending from said inlet end into said shroud member and a second curvilinear portion extending from said first portion to said outlet end, said delivery tube being operable to divert the direction of a stream of material impelled therethrough approximately 90° from said inlet end to said outlet end whereby said exhaust passage

is maintained at a constant volume by said shroud member and whereby said closed curvilinear blunt end of said shroud facilitates entry of the spout into the bag without damaging the inner wall thereof.

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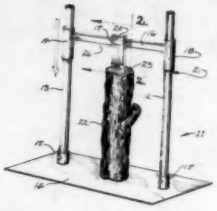
**4,391,311**

## LOG SPLITTING DEVICE

**Warren Levercom, 3901 Main St. NE., Blaine, Minn. 55434**

**Filed Mar. 16, 1981, Ser. No. 244,251**
**Int. Cl.³ B27L *7/00***
**U.S. Cl. 144—193 D** **9 Claims**



1. A log splitting device comprising:
a pair of vertical rails spaced apart and parallel to one another,
a splitting blade slideably connected between the rails,
a wedge secured to the splitting blade and extending below the lower level thereof with its cutting surface facing downward, and
a base plate adapted for securing the rails in vertical position with the splitting blade mounted thereon.

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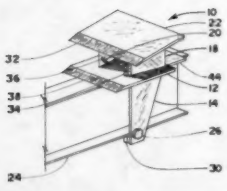
**4,391,312**

## LOG SPLITTING HEAD

**Gerard J. Sakraida, Jr., R.D. #2, Douglas Rd., Beaver Falls, Pa. 15010**

**Filed Jun. 1, 1981, Ser. No. 268,783**
**Int. Cl.³ B27L *7/00***
**U.S. Cl. 144—193 E** **16 Claims**



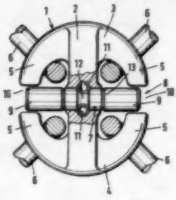

1. A log splitting head comprising:
A. a baseplate;
B. first and second vertical cutting plates opposed and spaced from each other and mounted to and perpendicular with the baseplate, each including a cutting edge;
C. a horizontal cutting plate mounted to and supported by the first and second cutting plates, and also including a cutting edge; and
D. means for securing the baseplate to the main frame of a log splitting machine.

**4,391,313**

## TIRE CHAIN

**Erhard A. Weidler, Aalen-Unterkochen, Fed. Rep. of Germany, assignor to RUD-Kettenfabrik Rieger & Dietz GmbH u. Co., Aalen, Fed. Rep. of Germany**

**Filed Sep. 9, 1982, Ser. No. 416,153**
**Claims priority, application Fed. Rep. of Germany, Sep. 17, 1981, 3137310**
**Int. Cl.³ B60C *27/00***
**U.S. Cl. 152—171** **18 Claims**



1. Tire chain with a net configuration having nodal points, in which at least three chain links are mutually connected in the region of the nodal points via a component which is arranged horizontally, that is to say parallel to the tire surface, and is provided with hook-shaped holding arms and insertion slots for hanging the chain links in and with at least one closure element for the insertion slots, characterised in that the component (**1;14;21;24;30;33;36;38;41;47;48**) has at least one substantially T-shaped section, of which the transverse bar (**3,4;16**) has curved legs which form holding arms (**5;17,18**) and the longitudinal bar (**2;15**) is provided with a bore (**7**), the axis of which runs substantially in the centre plane of the holding arms (**5;17,18**) and which serves to receive the centre part of a bolt-shaped closure element (**8;20;22;25;28;31;32;34;35;39;42;45;49;50**), the mutually opposite ends of which form locking pins (**9**) for the chain links (**6**) hung into the holding arms (**5;17,18**) of the T-shaped section and into at least one further holding arm (**19**).

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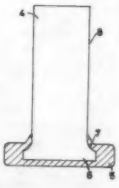
**4,391,314**

## SNOW TIRE SPIKES

**Jiro Inamoto, Amagasaki, and Naohiro Hayata, Kakogawa, both of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka and Sumitomo Rubber Industries, Ltd., Kobe, both of, Japan**

**Filed Apr. 2, 1981, Ser. No. 250,302**
**Claims priority, application Japan, Apr. 7, 1980, 55-45423**
**Int. Cl.³ B60C *11/00***
**U.S. Cl. 152—210** **6 Claims**




1. A snow tire spike which comprises:
a single, integral spike body made of a ceramic material, said spike body having a first end, defined by a first radially outer annular surface, for anchoring said spike in a tire, and a second end, defined by a second radially outer annular surface, for contacting the ground when said spike

is in use in the tire, said first end having a diameter larger than, but smaller than 1.5 times, the diameter of said second end, said first and second radially outer annular surfaces being joined by a third radially outer annular surface to form a continuous smooth surface at least from said second end to said first surface; and

a flange made of a plastic material coated directly on at least said first surface of said spike body, on the entirety of said first surface.

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**4,391,315**

**TIRE CHAIN WITH ATTACHING DEVICE**

**Gerald D. Jacobson, 1816 113 Dr. SE., Everett, Wash. 98205**

**Filed Jul. 13, 1981, Ser. No. 282,505**

**Int. Cl.³ B60C *27/00***

**U.S. Cl. 152—213 A** **5 Claims**

1. An anti-skid tire appliance adapted to be installed onto and removed from a vehicle tire, comprising:

a first elongated flexible side member adapted to extend circumferentially of the tire along the outer sidewall of the tire;

a second elongated flexible side member adapted to extend circumferentially of the tire along the inner sidewall of the tire;

a series of spaced apart cross members, connected at their ends to the side members and extending laterally across the tread of the tire, from one side member to the other;

said appliance having first and second ends;

each said side member having ring means at the first end of the appliance;

each said side member having an end portion at the second end of the appliance which extends outwardly beyond the end-most cross member at the second end of the appliance;

each said end portion having a hook at its outer end engageable with the ring means at the first end of the appliance, for securing the two ends of the appliance together and the appliance on the tire;

a first sidewall gripping member at the second end of the appliance, connected to the first side member adjacent said end-most cross member;

a ring adjacent said first sidewall gripping member;

a second sidewall gripping member at the second end of the appliance, connected to the second side member of the appliance adjacent said end-most cross member;

each said sidewall gripping member comprising sharply pointed members adapted to dig into and grip a sidewall portion of the tire when placed against such sidewall portion and pulled on towards the tread; and

said end portion of said second side member extending outwardly from the second sidewall gripping member and being constructed from an elastic material, and being adapted to be extended across the tire and stretched, to engage the hook at its end onto the ring means adjacent the first tire gripping member, so that when stretched said elastic end portion will exert a drawing force on the two tire gripping members, in the direction of the tread, for forcing the sharply pointed members into gripping engagement with the sidewalls of the tire.

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**4,391,316**

**ANTI-SKID DEVICE FOR VEHICLE WHEELS**

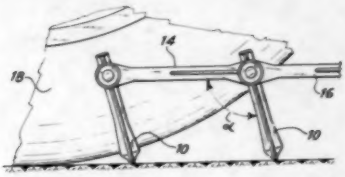
**Gianfranco Seggio, Via Tracia 7, Milan, Italy**

**Filed Sep. 16, 1981, Ser. No. 302,770**

**Claims priority, application Italy, Sep. 17, 1980, 22768/80[U]**

**Int. Cl.³ B60C *27/00***

**U.S. Cl. 152—213 A** **10 Claims**



1. An anti-skid device or skid chain for vehicle tires mounted on wheels comprising:

a plurality of U-shaped elements for radial mounting on said tires, each of said U-shaped elements including a base portion and first and second arm portions;

a first series of connecting levers each disposed between and pivotally affixed on the ends thereof to adjacent ones of said first arm portions;

a second series of connecting levers each disposed between and pivotally affixed on the ends thereof to adjacent ones of said second arm portions;

interlocking means for selectively substantially interlocking said U-shaped elements to said levers of said first and second series of levers in a range of positions such that said first and second arms of said U-shaped elements are disposed within a preselected range of angles relative to said levers of said first and second series; and

locking means for locking said levers of said first series to adjacent said levers of said first series within a preselected degree of movement, and for locking said levers of said second series to adjacent said levers of said second series within a preselected degree of movement.

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**4,391,317**

**BAND DEVICE FOR RETAINING A TIRE ON A WHEEL RIM**

**Bernard J. Savage, 7 Seymour Mews, London W.1, England**

**Filed Aug. 13, 1981, Ser. No. 292,706**

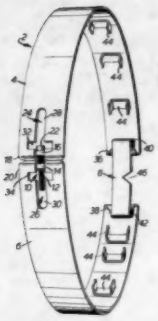
**Claims priority, application United Kingdom, Aug. 15, 1980, 8026636**

**Int. Cl.³ B60B *25/12, 21/10*; B60C *29/00***

**U.S. Cl. 152—330 RF** **6 Claims**

1. A band device for retaining a tire on a wheel rim in the event that the tire should become deflated, which band device comprises a first band portion which is part circular for substantially its entire length, a second band portion which is part circular for substantialy its entire length and which is substantially the same size as the first band portion, a link portion which is part circular for substantially its entire length and which is for joining the the first and second band portions together at one end, and fastener means for joining the first and

second band portions together at their other ends whereby the band portions and the link portion are retainable in position around a base of a wheel rim, the link portion having an apertured part for receiving a valve of a tube of a tire, the link portion being hooked at each end for connecting to inwardly directed ends of the first and second band portions whereby the link portion is positioned in use on the side of the band device that is adjacent the base of the wheel rim so that the inwardly directed pressure of the tire serves to bind the first



and second portions and the link portion tighter around the base of the wheel rim with increasing pressure, and the band device including a plurality of legs which are secured at spaced apart intervals to the first and second band portions on the side of the band device that is adjacent the base of the wheel rim, the base of the wheel rim having a well with an open mouth, and the legs being locatable in the well such that they support the first and second band portions in a well-blocking position at the mouth of the well and such that they allow the first and second band portions to flex with the wheel rim.

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**4,391,318**

## COMPOSITE OF RUBBER AND METAL REINFORCEMENT THEREFOR

**Frank S. Maxey, deceased, late of Uniontown, Ohio (by Gertrude Maxey, legal representative), and Syed K. Mowdood, Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed May 11, 1981, Ser. No. 262,163**
**Int. Cl.³ B60C *1/00*; B32B *25/02***
**U.S. Cl. 152—359** **17 Claims**

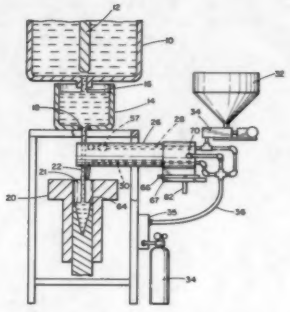
1. A composite of rubber composition containing zinc oxide, carbon black, optionally and/or mineral fillers, cure accelerator(s), fatty acid and/or metal salt thereof, and filament reinforcement therefor where said filament is selected from at least one of steel, organic and inorganic filaments, optionally as a multiple of filaments cabled together to form a cord, characterized in that (i) when said filament or cord thereof is steel, said rubber composition contains (A) about 0.05 to 8 phr of a compound selected from at least one of diallyl cyanurate, triallyl cyanurate, tris(2-hydroxyethyl) cyanurate, triphenyl cyanurate, diallyl isocyanurate, triallyl isocyanurate, and 4-ketobenz triazine and, optionally, (B) about 0.05 to about 10 phr of at least one borate as the product of (i) a metal selected from Groups IA, IIA, IIB, IVA, IVB, and VIII of the Periodic Table of the Elements, and (ii) an acid selected from the group consisting of boric, orthoboric, metaboric or polyboric acid; and when said filament or cord thereof is not steel the rubber composition contains both the (A) compound and the (B) borate.

**4,391,319**

## APPARATUS FOR INTRODUCING ELEMENTS INTO MOLTEN METAL STREAMS AND CASTING IN INERT ATMOSPHERE

**Lawrence J. Heaslip, Toronto, Canada; Alphia L. Hohulin, Tremont, and Joseph R. Mitchell, Peoria, both of Ill., assignors to Keystone Consolidated Industries, Inc., Peoria, Ill.**

**Continuation of Ser. No. 70,347, Aug. 27, 1979, abandoned. This application Jun. 29, 1981, Ser. No. 278,719**
**Int. Cl.³ B22D *35/04, 11/10***
**U.S. Cl. 164—259** **4 Claims**



1. In a casting system including a casting mold and a tundish arranged above the casting mold, the improvement of apparatus for adding an alloy material to a molten metal stream flowing form the tundish into the casting mold comprising in combination:

a hollow tube generally extending in a horizontal direction, said tube having a closed end and an open end; means associated with the hollow tube for positioning the open end of the hollow tube between the tundish and the casting mold and adapted to be in opposed relation to and on one side of a molten metal stream and for maintaining the tube generally transverse to a direction of travel of a molten metal stream from the tundish to the casting mold;

means associated with the closed end of the hollow tube for supplying inert gas to said hollow tube for discharge from the open end toward and around a molten metal stream, said open end being unblocked to permit visual observation of a molten metal stream on a side opposite the open end;

means mounted in the hollow tube to reduce the velocity of the inert gas supplied to the hollow tube to produce a low velocity gas exciting the open end of the hollow tube;

an alloy feed tube positioned within the hollow tube, said alloy feed tube including an inert gas inlet, and alloy inlet for receiving pellets of alloy material and a discharge nozzle arranged at the open end of the hollow tube and having an outlet directed toward the open end of the hollow tube;

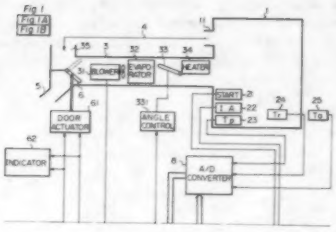
means associated with the alloy feed tube for supplying a mixture of alloy material and inert gas at a relatively higher velocity then the velocity of said low velocity gas to the alloy feed tube;

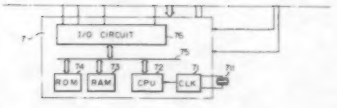
a gas feed tube in the hollow tube having an outlet at the open end of the hollow tube, said outlet being arranged to direct inert gas toward said casting mold; and means in the alloy feed tube for directing the alloy pellets by flow of said relatively higher velocity inert gas into the molten metal stream simultaneous with the low velocity inert gas flow which envelopes the molten metal stream.

## 4,391,320
## METHOD AND AN APPARATUS FOR AIR CONDITIONING FOR VEHICLES BY CONTROLLING CIRCULATION OF INSIDE AIR AND INTRODUCTION OF OUTSIDE AIR

Yozo Inoue, Chiryu; Yoji Ito; Kiyoshi Hara, both of Kariya; Kiyoshi Usami, Oobu, and Yasuhiro Iwata, Aichi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 22, 1980, Ser. No. 171,030
Claims priority, application Japan, Jul. 24, 1979, 54-94769
Int. Cl.³ F25B 29/00
U.S. Cl. 165—2 3 Claims




1. A method for air conditioning for vehicles with passenger compartments by controlling circulation of inside air and introduction of outside air in which an inlet for inside air and an inlet for outside air are selectively opened and closed, and the circulation of inside air and the introduction of outside air are selectively effected, characterized in that said method comprises: a step of detecting a temperature of a vehicle passenger compartment, atmospheric temperature and a preset temperature in an initial period of air conditioning, a step of judging the results of comparisons between said temperatures, a step of switching between air conditioning by the circulation of inside air and air conditioning by the introduction of outside air, a step of producing an instruction for the introduction of outside air if either the passenger compartment temperature is higher than the atmospheric temperature and higher than a preset temperature or if the passenger compartment temperature is lower than the atmospheric temperature and lower than a preset temperature, and a step of producing an instruction for the circulation of inside air if one of the following conditions is established:

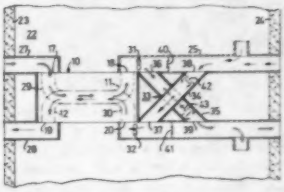
(a) the passenger compartment temperature is higher than the atmospheric temperature and lower than a preset temperature,

(b) the passenger compartment temperature is lower than the atmospheric temperature and higher than a preset temperature.

## 4,391,321
## HEAT EXCHANGER IN PLANTS FOR VENTILATING ROOMS OR BUILDINGS

Svante Thunberg, Observatoriegatan 12, S-113 29 Stockholm, Sweden

PCT No. PCT/SE80/00085, § 371 Date Nov. 20, 1980, § 102(e) Date Nov. 20, 1980, PCT Pub. No. WO80/02064, PCT Pub. Date Oct. 2, 1980
PCT Filed Mar. 21, 1980, Ser. No. 217,019
Claims priority, application Sweden, Mar. 21, 1979, 7902549
Int. Cl.³ F24H 3/06
U.S. Cl. 165—54 2 Claims



1. In a ventilating system for a building: first and second duct systems separated by partition walls and arranged in heat-exchange relationship such that heat may be transmitted from air flowing through one duct system, through the partition walls, to air flowing through the other duct system; reversible fan means associated with each duct system for passing air through the two duct systems countercurrently; a first outside air duct placing one end of the first duct system in communication with outside air and a first inside air duct placing the other end of the first duct system in communication with inside air; a second outside air duct placing one end of the second duct system in communication with outside air and a second inside air duct placing the other end of the second duct system in communication with inside air; and valve means for controlling air flow including first and second branch ducts arranged in crossing relationship, each branch duct having a first end connected to said first inside air duct and a second end connected to said second inside air duct, a non-return valve in each said first and second inside air ducts at locations between the connections of the branch ducts to said first and second inside air ducts, and a non-return valve in each said branch duct, the arrangement being such that in one mode of fan operation outside air flows through said first outside air duct, said first duct system, said first branch duct and into said second inside air duct while inside air flows through said first inside air duct, said second branch duct, said second duct system into said second outside air duct, and in another mode of fan operation outside air flows through said second outside air duct, said second duct system into said second inside air duct while inside air flows through said first inside air duct, said first duct system into said first outside air duct.

## 4,391,322
## WIRE GUIDE FOR USE WITH A HEAT EXCHANGE UNIT

Joseph A. Ciarlei, Brewerton; Curtis L. Tobin, Chittenango, and William B. Jennings, Clay, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Nov. 3, 1980, Ser. No. 202,980
Int. Cl.³ F28F 13/12
U.S. Cl. 165—125 6 Claims

1. A heat exchange unit comprising:

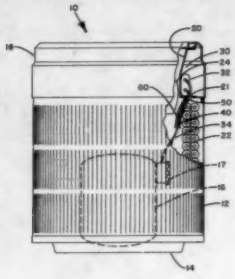
support means for supporting the unit;

a heat exchanger mounted to the support means and extending about at least a portion of the periphery of the unit;

a fan for circulating air in heat exchange relation with the heat exchanger;

means defining a control area circumferentially spaced about the fan and adjacent the heat exchanger wherein at least

one electrical component of the heat exchange unit may be mounted, said means additionally defining a wire guide opening; and



a wire guide connected to extend through the wire guide opening and between the fan and the heat exchanger, said wire guide defining a wire securing cavity and including means for connecting the wire guide to the means defining the control area.

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**4,391,323**

**BAFFLE FOR HEATING PIPES**

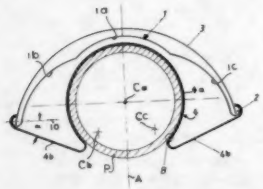
**Erhard Schnier, Roemerstr. 18, D-7143 Vaihingen/Enz 7 (Württemberg), Fed. Rep. of Germany**

**Filed Jan. 7, 1981, Ser. No. 223,097**

**Claims priority, application Fed. Rep. of Germany, Jan. 10, 1980, 8000478[U]**

**Int. Cl.³ F28F *1/20*; F24D *19/06***

**U.S. Cl. 165—183** **9 Claims**



1. A reflector, particularly for mounting above a heating pipe to reflect heat radiated upwardly by the pipe, comprising an elongated sheet-material reflector body having at least three parallel longitudinally extending concave sections each of which is arcuately curved in transverse direction; each of said arcuately curved sections having a center of curvature, the center of curvature of a center one of said sections being located in a vertical longitudinal plane of symmetry of said reflector body; and the centers of curvature of the sections which flank said center section being laterally spaced from said vertical plane in mutually opposite direction and being spaced from the center of curvature of said center section in a direction away from the center section.

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**4,391,324**

**GEOTHERMAL WELL HEAD AND ACTUATOR ASSEMBLY**

**Lehman T. Reed, Bakersfield, Calif., assignor to Midway Fishing Tool Co., Long Beach, Calif.**

**Filed Aug. 10, 1981, Ser. No. 291,377**

**Int. Cl.³ E21B *37/04***

**U.S. Cl. 166—70** **8 Claims**

1. In combination with a geothermal well that has a string of casing that extends to a producing zone, said string of casing having an upper end, a device in communication with said upper end that controls the flow of geothermal fluid from said well, said device capable of having solid deposited material scraped from the interior surface thereof without shutting down said well, said device including:

a. a first assembly that includes an elongate tubular body that has upper and lower ends and is vertically disposed; first means that effect communication between said lower end of said tubular body and said upper end of said casing; upper and lower longitudinally spaced sets of pins supported on said tubular member that may be moved inwardly and outwardly relative thereto, each of said upper and lower pins having an inner end portion; at least one tubular boss that projects outwardly from said tubular body below said lower set of pins; and a valve in communication with said tubular boss for controlling the flow of geothermal fluid therefrom;

b. a gate valve that includes an elongate valve body that when vertically disposed has upper and lower ends, a transversely movable valve member, and said valve body having a longitudinally extending interior passage of at least as great transverse cross section as that of the interior of said tubular body;

c. second means for securing said lower end of said gate valve to said upper end of said tubular body;

d. a hydraulic cylinder assembly that includes a hydraulic cylinder that has a top and bottom; a piston slidably

mounted in said cylinder; third means for discharging hydraulic fluid under pressure into and out of said cylinder to move said piston upwardly and downwardly therein; fourth means for removably securing said bottom of said hydraulic cylinder to said upper end of said gate valve; a graduated rod that extends upwardly through a seal defining opening in said top of said hydraulic cylinder; an actuating member that extends downwardly from said piston through a seal defining opening in said bottom of said hydraulic cylinder, downwardly through said gate valve body when said valve member is in an outwardly disposed position; a transverse pin on a lower portion of said actuating member, which pin has projecting end portions; and a force exerting member supported from said actuating member above said pin;

e. a plug assembly that includes a rigid body that has a cylindrical sidewall, a top surface, and a bottom surface that may be disposed in said tubular body; a circular recess in said sidewall that extends downwardly from said top surface to terminate in a circular body shoulder; resilient packing means in said recess; a cavity that extends downwardly from said top surface into rigid body to terminate in a bottom, said cavity having a pair of vertical grooves extending outwardly from the portion thereof adjacent said top, said pair of grooves that extend from intermediate positions of said vertical grooves, said vertical and

horizontal grooves being removably engageable by said projecting end portions of said transverse pin; a plurality of slots that extend upwardly in said cylindrical sidewall from said bottom surface that may be radially aligned with said lower pins; a rigid force receiving ring that has a downwardly extending first leg that abuts against said packing means and an inwardly extending second leg that may be contacted by said force exerting ring, said force receiving ring having a pluraliry of circumferentially spaced grooves therein that may be engaged by said upper pins when said packing means is compressed by downward movement of said first leg of said force receiving ring; spring means in said cavity that exert an upward force on said actuator member that tends to maintain said end portions of said transverse pin above said horizontal slots when said end portions are in said vertical grooves; and fifth means that slidably connect said force receiving ring to said body of said plug assembly, with said force receiving ring only compressing said packing means into sealing contact with the interior surface of said tubular body of said first assembly until after said transverse pin end portions have moved downwardly in said vertical grooves below said horizontal grooves; with said graduated rod visually indicating the position of said plug assembly in said tubular body;

f. first and second insignias on said graduated rod and said top of said hydraulic cylinder which when in a predetermined position relative to one another indicate said slots and grooves are radially with said upper and lower pins; and

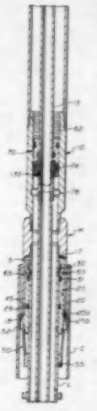
g. sixth means for rotating said graduated rod together with said piston and actuating member, with said plug assembly being in a sealing position in said tubular body when said lower pins have said inner end portions in engagement with said slots and said inner end portions of said upper pins engage said grooves; with said plug scraping said foreign material from the interior of said tubular body of said first assembly when said graduated rod, piston and actuating member are rotated to dispose said transverse pin end portions in said horizontal slots, said lower pins are moved outwardly from disengagement from said slots, and said piston is caused to move said actuating member and plug assembly downwardly in said tubular member for said teeth to scrape said foreign material therefrom; said plug assembly being returned to a sealing position when said first and second insignia are aligned, said plug is moved upwardly in said tubular body to a position where said slots are above said lower pins, said lower pins are moved inwardly, said plug assembly is moved downwardly for said inner end portions of said pins to engage said slots, said actuating member, piston and graduated rod are rotated to dispose said transverse pin end portions in said vertical grooves, said actuating member is moved downwardly to move said force exerting ring and force receiving ring downwardly until said grooves are below said upper pins, said upper pins are moved inwardly to engage said grooves to maintain said packing means in compressed sealing contact with the interior surface of said tubular body of said first assembly; and said plug assembly, actuator rod and hydraulic cylinder assembly capable of being removed from said first assembly by rotating said actuator rod to dispose said inner end portions of said transverse pins in said horizontal slots, moving said upper pins outwardly from engagement with said grooves, moving said plug assembly upwardly in said elongate body of said gate valve above said transversely movable valve member, and moving said valve member to an inwardly disposed position whereupon said hydraulic cylinder assembly, actuator member and plug assembly may be removed from said gate valves without shutting down said well.

**4,391,325**

## LINER AND HYDRAULIC LINER HANGER SETTING ARRANGEMENT

**Samuel F. Baker, Conroe, and Ronald D. Arnold, Missouri City, both of Tex., assignors to Texas Iron Works, Inc., Houston, Tex.**

**Filed Oct. 27, 1980, Ser. No. 201,309**
**Int. Cl.³ E21B *23/04***
**U.S. Cl. 166—208** **10 Claims**



1. In a hydraulic liner setting arrangement for setting a liner in a well bore casing wherein the setting arrangement includes a setting tool with a tubular mandrel forming part of a pipe string which is connected to, and extends into, the liner including a housing which surrounds and extends longitudinally of the liner so that the liner and housing form inner and wall portions defining an annular recess, the invention comprising:

a. longitudinally extending piston means including seal means to sealably engage said piston means in the recess and said piston means having a cone shaped end;

b. means to secure said piston means against premature upward movement into the recess;

c. slip means;

d. means releasably securing said slip means to the liner;

e. port means in the liner for communicating fluid from the tubular mandrel to the recess to move said piston means downwardly in the recess and engage said cone shaped end with said slip means and thereby urge said slip means into engagement with the well bore casing for securing the liner to the casing; and

f. said seal means on said piston means including spaced seal means sealably engaging the inner wall of the recess, said piston means being retractable into the recess by lowering the setting tool and liner relative to said piston means after said slip means engages the casing, said spaced seal means being located on said piston means so as to span the housing port means to thereby seal off communication between the port means and recess.

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**4,391,326**

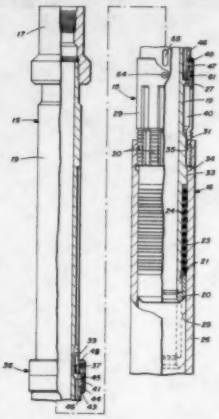
## STINGER ASSEMBLY FOR OIL WELL TOOL

**Donald R. Greenlee, Cedar Hill, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.**

**Filed Jan. 22, 1981, Ser. No. 227,291**
**Int. Cl.³ E21B *23/00***
**U.S. Cl. 166—240** **12 Claims**

2. A stinger assembly for use in releasably connecting an upper section of a tubing string to a tool in a well including a mandrel having a master cam slot therein defining upper and lower support shoulders, an indexable collar telescoped onto

said mandrel, a follower connected to said collar and extending into said master cam slot, a collet journaled on said collar and having a plurality of radially flexible spring-fingers connected thereto for latching said mandrel to the tool, said mandrel having an outer surface for blocking said fingers from deflecting inwardly and a recess wherein said fingers are free to deflect radially inwardly for connecting to and releasing from the tool, said upper support shoulder locating said spring-fingers vertically in registery with said recess when engaging said follower.



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**4,391,327**

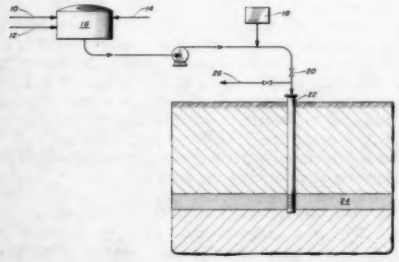
**SOLVENT FOAM STIMULATION OF COAL DEGASIFICATION WELL**

**Leonard J. De Carlo, Morgantown, W. Va., assignor to Conoco Inc., Ponca City, Okla.**

**Filed May 11, 1981, Ser. No. 262,575**

**Int. Cl.³ E21B *43/26, 43/27***

**U.S. Cl. 166—307** **5 Claims**



1. A method for improving the gas drainage characteristics of a coal seam comprising:

(a) injecting into said coal seam a foamed fluid comprised of a liquid solvent selected from the group consisting of toluene, pyridine, xylene, tetralin, anthracene, coal tar and mixtures thereof, a foam-producing surfactant and a high pressure gas, said foamed fluid containing an amount of said solvent effective to partially dissolve coal contacted by said foamed fluid;

(b) maintaining said foamed fluid in contact with said coal seam for a period of time sufficient for said solvent to partially dissolve coal contacted therewith thereby improving the gas drainage charscteristics of said coal seam; and

(c) recovering injected material and naturally occurring gas from said coal seam.

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**4,391,328**

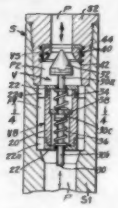
**DRILL STRING SAFETY VALVE**

**James T. Aumann, Salt Lake City, Utah, assignor to Christensen, Inc., Salt Lake City, Utah**

**Filed May 20, 1981, Ser. No. 265,716**

**Int. Cl.³ E21B *34/08***

**U.S. Cl. 166—325** **6 Claims**



1. A safety valve for allowing controlled normal flow and preventing uncontrolled abnormal back flow of fluid pressure through an internal passage of a drill string casing comprising:

a valve seat situated in and around a portion of the internal passage in a portion of the drill string casing;

a valve body retained within an adjoining portion of the internal passage in the drill string casing and adapted to allow fluid to pass around and through the internal passage comprising

a cylinder including an outer sidewall and an internal chamber within the outer side wall extending between opposite ends of the cylinder, and

closure means attached to and closing off opposite ends of the cylinder and internal chamber;

a movable valve stem including opposite end portions each slideably mounted in an aperature extending through each of the closure means of the valve body;

a valve head attached to an opposite end portion of the valve stem, adapted for sealing engagement with the valve seat and normally maintained in a partially open position relative to the valve seat sufficient to allow passage of fluid and suspended cuttings during tripping of the drill string casing into and out of the borehole, but displacable to a wide open position in response to a predetermined normal amount of differential fluid pressure in the internal passage directed downstream against one side of the valve head and movable into sealing mating engagement with the valve seat in response to a predetermined abnormal amount of differential fluid back pressure in the internal passage directed back upstream against an opposite side of the valve head; and

biasing means of predetermined opposing force comprising

abutment means projecting from an intermediate portion of the movable valve stem within the internal chamber, and

resilient means extending about each of the opposite end portions of the valve stem and compressible between each of the closure means and the abutment means on and movable with the valve stem for opposing movement of, returning and maintaining the valve stem in a predetermined normal position and the attached valve head in the partially open position in absence of and until the predetermined amount of differential fluid pressure directed against one side of the valve head is sufficiently greater than the opposing force of the resilient means and any fluid pressure directed against an opposite side of the valve head and thereby displace the

valve head from the partially open position toward either the wide open position or a closed position.

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**4,391,329**

## USE OF MARKER FLUID IN CEMENTING OFFSHORE WELLS

**Julius P. Gallus, Anaheim, Calif., assignor to Union Oil Company of California, Brea, Calif.**

**Filed May 14, 1981, Ser. No. 263,510**
**Int. Cl.³ E21B *33/14***
**U.S. Cl. 166—336** **12 Claims**

1. Method for cementing casing in an offshore well completed under water comprising sequentially:

(a) drilling a borehole,

(b) positioning a drilling fluid in the borehole,

(c) positioning one or more connected sections of casing in the borehole,

(d) injecting into the casing, out the bottom thereof, up the annular space between the casing and the borehole and out into the surrounding water a slug of about 2 to 20 barrels of a black colored marker fluid comprising:

[1] 100 parts by weight cement;

[2] about 35 to 56 parts by weight water,

[3] about 5 to 8 parts by weight particulate carbon black,

[4] about 4 to 6.4 parts by weight coal dust, and

[5] about 0.52 to 0.84 parts by weight surface active agent,

(e) injecting into the casing via the same route a cement slurry,

(f) observing the displaced fluid emerging into the surrounding water from the annular space,

(g) observing when the black colored marker fluid begins to emerge from the annular space,

(h) removing the cement slurry from the casing, and

(i) shutting in the well for sufficient time to allow the cement slurry to set.

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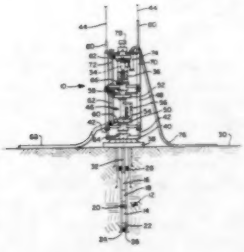
**4,391,330**

## APPARATUS AND METHOD FOR INSTALLING AND ENERGIZING SUBMERGIBLE PUMP IN UNDERWATER WELL

**Karl Kiefer, Bartlesville, Okla., assignor to TRW Inc., Cleveland, Ohio**

**Division of Ser. No. 78,907, Sep. 25, 1979, Pat. No. 4,304,452. This application Sep. 1, 1981, Ser. No. 298,503**
**Int. Cl.³ E21B *33/043***
**U.S. Cl. 166—341** **5 Claims**



1. A method of installing and energizing an electric submergible pump in an underwater well, comprising providing at an underwater wellhead a spool having a bore aligned with the well and having a first set of electrical contacts at a contact region of the bore, suspending the pump from a suspension head having a second set of contacts adapted to engage corresponding contacts of the first set, lowering the suspension head and the pump into the bore with the pump passing through the bore into the well, and with the contacts of the second set positioned for engagement with the corresponding contacts of the first set, introducing a cleaning fluid into the contact region of the bore through the suspension head, exhausting the cleaning fluid from the contact region through the bore in the spool, fixing the suspension head in the bore, and sealing the contact region of the bore so as to exclude well fluid therefrom.

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**4,391,331**

## GUIDES FOR USE IN FORMING PIPE CONNECTIONS AND A PROCESS OF FORMING PIPE CONNECTIONS

**Keith Shotbolt, Gerrards Cross, England, assignor to Constructors John Brown Limited, London, England**

**Filed Aug. 8, 1980, Ser. No. 176,293**
**Claims priority, application United Kingdom, Aug. 10, 1979, 7928006**
**Int. Cl.³ E21B *7/128***
**U.S. Cl. 166—342** **8 Claims**

1. A guide for use in connecting a pipe to a connector of a sub sea wellhead, which guide comprises a guide post having a reversibly radially expandable portion to locate in and rigidly attach the guide post to the sub sea wellhead, and an elongate portion to be received in the pipe wherein the elongate portion comprises an elongate sleeve freely rotatable about the axis of the post for supporting the pipe for rotation to connect to the wellhead and suitable to constrain the pipe to an orientation in which it is concentric and coaxial with the wellhead connector.

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**4,391,332**

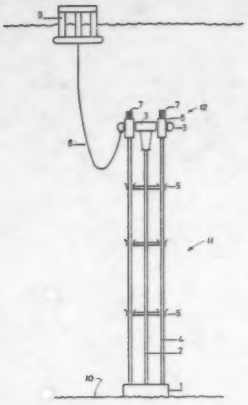
## OFFSHORE FACILITY FOR RECOVERY HYDROCARBON DEPOSITS FROM DEEP SEA BEDS

**Jose M. Fayren, Madrid, Spain, assignor to Astilleros y Talleres del Noroeste, S.A., Madrid, Spain**

**Filed May 18, 1981, Ser. No. 264,951**
**Claims priority, application Spain, May 20, 1980, 491,645**
**Int. Cl.³ E21B *43/00***
**U.S. Cl. 166—350** **4 Claims**

1. An improved facility, for the drilling and production of hydrocarbon deposits located in a deep sea bed, of the type having a submarine base secured to the deep sea bed, a bundle of tubular conduits connected to the submarine base and vertically extended therefrom to a moderate depth where the effect of surface sea waves is negligible, a subsea buoy connected to the top end of the bundle of tubular conduits at the moderate depth to thereby exert an ascensional force which places the tubular conduits under a vertical tension, well heads mounted on at least some of the tubular conduits, control means mounted on the subsea buoy for controlling the well heads for drilling and producing hydrocarbons, a floating plant adapted to float at sea level, and a top conductor connected to the

subsea buoy and the floating plant, the improvement, in combination therewith, wherein the bundle of tubular conduits comprises a central structural column having a bottom end secured to the submarine base and a top end secured to the subsea buoy, a plurality of peripheral tubular conduits located around said



central structural column, guide means for securing said peripheral tubular conduits to said central structural column at vertically spaced intervals, said peripheral tubular conduits being mounted to said guide means for sliding movement relative thereto and in a parallel position relative to said central structural column.

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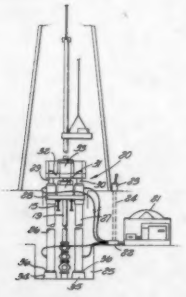
**4,391,333**

**WELL CASING JACK MECHANISM**

**George I. Boyadjieff, Anaheim, and Andrew B. Campbell, San Marino, both of Calif., assignors to Varco International, Inc., Orange, Calif.**

**Filed Jul. 17, 1980, Ser. No. 169,718**
**Int. Cl.³ E21B 7/20**
**U.S. Cl. 166—379** **10 Claims**



1. The method that comprises:

drilling a well utilizing a rig which includes a mast projecting upwardly above the well in a predetermined drilling position, and utilizing a drill string extending along a predetermined axis relative to said mast and downwardly into the well;

removing said drill string from the rig after completion of the drilling operation;

then lowering along said axis and into the well, while said mast remains in said drilling position above the well, a string of casing which, during at least a portion of the casing lowering operation, has a weight greater than the load supporting capacity of said mast used in drilling;

effecting the downward movement of said casing string, during at least said portion of the casing lowering operation when the weight of the string exceeds the capacity of the mast, by relatively vertically actuating two casing supporting units of a jacking mechanism positioned in the rig, with the casing string being supported alternately by the two units respectively; and

transmitting downward load forces resulting from the weight of said casing string from each of said supporting units to the earth without transmission of said forces through said mast, but while said mast used in drilling remains in said drilling position above the well.

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**4,391,334**

**HITCH ASSEMBLY**

**Lawrence K. Carrick, Spokane, Wash., assignor to Calkins Manufacturing Company, Spokane, Wash.**

**Filed Jan. 2, 1981, Ser. No. 222,127**
**Int. Cl.³ A01B 59/04**
**U.S. Cl. 172—326** **20 Claims**

1. A ground-working tool for attachment to a towing vehicle, comprising:

a first longitudinal hitch frame having a front end adapted for connection to the towing vehicle, and a rear end;

a second longitudinal hitch frame;

hinge means mounting the rear end of the first longitudinal hitch frame to the second hitch frame for relative pivotal movement about a horizontal transverse axis;

a ground-working implement operatively mounted to the second hitch frame;

lift means on the second hitch frame for moving the ground working implement between an elevated inoperative position above the ground-working surface and an operative position engaging the ground

wherein the lift means is comprised of a ground-engaging wheel and hydraulic cylinder means on the second hitch frame, mounting the wheel to the second hitch frame and selectively operable to raise and lower the second hitch frame and attached implement between the operative and inoperative positions;

control means operably connected with the hydraulic cylinder means to operate in conjunction with operation of the hydraulic cylinder means for alternately operating to (a) lock the first and second hitch frames together when the ground-working implement is in the elevated inoperative position; (b) tip the second hitch frame and ground-working implement downward and forwardly as the support means is operated to move the ground-working implement to its operative position engaging the ground; and (c) permit pivotal movement between the hitch frames relative to one another about the hinge axis after the ground-working implement has been moved to its operative position;

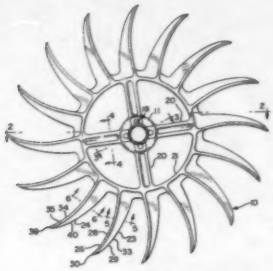
wheels movably holding the first hitch frame at a selected elevation; and

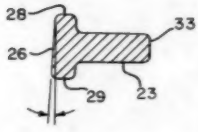
suspension means between the wheels and first hitch frame mounting the wheels to the first hitch frame for pivotal movement about a longitudinal axis.

## 4,391,335
## ROTARY HOE WHEEL

Eugen J. Birkenbach, Kildeer, Ill., assignor to International Harvester Co., Chicago, Ill.

Filed Feb. 2, 1981, Ser. No. 230,979
Int. Cl.³ A01B 21/04
U.S. Cl. 172—540 8 Claims






1. A rotary hoe wheel adapted to be drawn over the soil and comprising a hub adapted to be rotationally connected to a supporting member, a plurality of spokes extending radially from said hub, a generally circular flange connected to said spokes outward of said hub and a plurality of radially extending rearwardly curved to the direction of travel teeth connected to said flange and extending to a distal end adapted to work the soil, a tooth of said plurality having a rearward surface that is tapered at substantially 3° generally from one lateral surface rearwardly to the other from said distal end radially inwardly for the entire soil working portion of said tooth to engage, lift and move soil to one side of the wheel but rearwardly and the adjacent tooth rearward surface similarly and oppositely tapered at substantially 3° but also rearwardly to similarly move soil to the other side of the wheel but rearwardly with the teeth alternating in this sequence around the flange.

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## 4,391,336
## ACOUSTIC SYSTEM TO GUIDE A COAL SEAM AUGER

Julian B. Coon, Ponca City, Okla.; James C. Fowler, Burke, Va.; Charles E. Payton, Houston, Tex., and Kenneth H. Waters, Cape Town, South Africa, assignors to Conoco Inc., Ponca City, Okla.

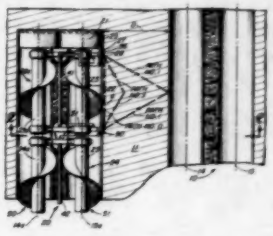
PCT No. PCT/US80/01565, § 371 Date Aug. 21, 1981, § 102(e) Date Aug. 21, 1981, PCT Pub. No. WO82/01908, PCT Pub. Date Jun. 10, 1982
PCT Filed Nov. 24, 1980, Ser. No. 301,993
Int. Cl.³ E21B 47/09
U.S. Cl. 175—45 4 Claims

1. Method for boring a hole so that its axis is substantially parallel to the axis of a previously bored hole comprising:

(a) positioning an acoustical transmitter and receiver in acoustical communication with the wall of the hole being bored so that their position on the said wall lies on a plane through the axis of said hole being bored and the axis of the previously bored hole;

(b) transmitting a continuous frequency acoustical signal into the wall of said hole;

(c) receiving the reflected signal from the adjacent wall along with other unwanted acoustical reflections;



(d) determining the phase shift between said transmitted signal and said first received signal; and

(e) determining the changes in the distance between the wall of said bored hole and said hole being bored.

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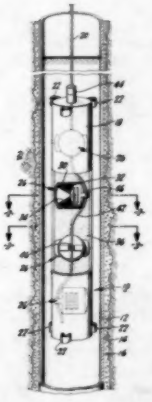
## 4,391,337
## HIGH-VELOCITY JET AND PROPELLANT FRACTURE DEVICE FOR GAS AND OIL WELL PRODUCTION

Franklin C. Ford, 3459 Edison Way, Fremont, Calif. 94538; Gilman A. Hill, 6200 Plateau Dr., Englewood, Colo. 80110, and Coye T. Vincent, 1201 Eva Ave., Los Altos, Calif. 94022

Filed Mar. 27, 1981, Ser. No. 248,322
Int. Cl.³ E21B 43/117
U.S. Cl. 175—4.6 9 Claims



1. An integrated jet perforation and controlled propellant fracture device for use in combination with a conventional tamping means to enhance gas and liquid wells by perforating and fracturing well formation materials comprising:

a housing having suspension means for locating said housing at a predetermined location in a well;

at least one jet perforation unit contained in said housing having a launchable projectile jet and an explosive charge means for launching said projectile jet;

a controlled-burn, gas propellant material contained in said housing proximate said jet perforation unit; and

firing means for igniting said propellant material and detonating said charge means in a substantially simultaneous manner, said propellant material having the characteristic

on ignition of generating gases which instantaneously follow said jet, said gases having a pressure pulse to augment and enhance fractures in a geological structure around the well which are initiated by said jet, wherein in use in a well having tamping means said device is constructed and arranged to produce gases having a pressure pulse peak below the plastic flow limit of the well formation materials.

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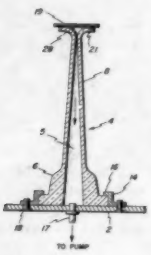
**4,391,338**

## MICROBALANCE AND METHOD FOR MEASURING THE MASS OF MATTER SUSPENDED WITHIN A FLUID MEDIUM

**Harvey Patashnick, 27 Crow Ridge Rd., Voorheesville, N.Y. 12186, and Georg Rupprecht, R.D. #3, Apartment 67, Altamont, N.Y. 12009**

**Filed Apr. 4, 1980, Ser. No. 137,424**
**Int. Cl.³ G01G *3/14*; G01N *31/00***
**U.S. Cl. 177—210 FP** **14 Claims**



**1.** Apparatus for measuring the mass of matter suspended in a medium comprising:

an elongate elastic element having a first end which is anchored and a second end free to oscillate;

filter means attached to the free end for receiving matter whose mass is to be measured;

means for driving said element so that its second end with the filter means attached will oscillate at a resonant frequency;

means for passing the medium containing the matter through the filter means as it oscillates in order to deposit the matter thereon; and

means for sensing changes in the resonant frequency of oscillation of said element and filter as they oscillate.

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**4,391,339**

## CAVITATING LIQUID JET ASSISTED DRILL BIT AND METHOD FOR DEEP-HOLE DRILLING

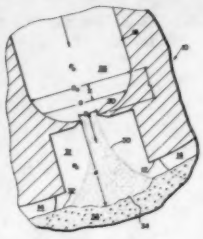
**Virgil E. Johnson, Jr., Gaithersburg; T. R. Sundaram, Columbia, and Andrew F. Conn, Baltimore, all of Md., assignors to Hydronautics, Incorporated, Laurel, Md.**

**Continuation of Ser. No. 931,244, Aug. 4, 1978, Pat. No. 4,262,757. This application Dec. 1, 1980, Ser. No. 211,662**
**Int. Cl.³ E21B *10/60***
**U.S. Cl. 175—393** **4 Claims**

**1.** A cavitating liquid jet nozzle for causing cavitational errosion of a solid surface comprising a housing for receiving a liquid and having an inlet end and an outlet end, said housing having an interior chamber tapering from the inlet end toward a narrower orifice at the outlet end and being shaped in accordance with the following formula:

$$\frac{D}{D_O} = 1 - \left(1 - \frac{D_E}{D_O}\right)\left(\frac{D_O}{L} \times \frac{x}{D_O}\right)^n$$

wherein $D_O$ is the initial diameter of the chamber; $D_E$ is the diameter of the outlet orifice; L is the distance between $D_O$ and $D_E$; and D is the diameter of the chamber at any point between



$D_O$ and $D_E$ at a distance X from $D_O$ and wherein $D_O/L$ is 2 or greater; $D_O/D_E$ is 3 or greater; and n is 2 or greater.

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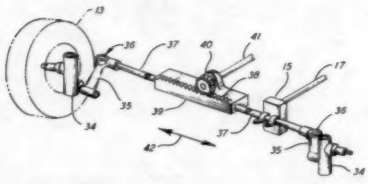
**4,391,340**

## DITHER ASSISTED STEERING

**John Z. DeLorean, 280 Park Ave., New York, N.Y. 10017**

**Filed Feb. 4, 1981, Ser. No. 231,399**
**Int. Cl.³ B62D *3/00***
**U.S. Cl. 180—79** **12 Claims**



**3.** In combination with a steering system linkage coupling a steering wheel to wheels having tires thereon, apparatus for reducing steering effort at low speeds by introducing a low amplitude dither into the steering linkage, comprising:

(a) means including an oscillating system attached to the steering linkage; and

(b) means to input energy to said oscillating system.

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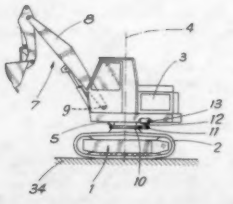
**4,391,341**

## SUPPORTING CHASSIS FOR A WORKING MACHINE, SUCH AS A HYDRAULIC SHOVEL

**Daniel Taghon, Cinqueux, France, assignor to Poclain, Le Plessis Belleville, France**

**Filed Oct. 1, 1980, Ser. No. 192,924**
**Claims priority, application France, Oct. 11, 1979, 79 25381**
**Int. Cl.³ B62D *55/00***
**U.S. Cl. 180—9.2 R** **10 Claims**



**1.** Supporting chassis for a working machine such as a hydraulic shovel, comprising two longitudinal side-members, preferably two lateral side-members, each side member being

essentially constituted by a metal sheet which is bent in such a way that its cross-section presents a downward oriented concavity, and by a plate closing off the bent metal sheet, the lower edges of said metal sheet being secured to said plate; the improvement wherein said plate is monobloc and obtained by rolling and comprises a central zone of predetermined thickness, which is flanked on each one of its sides with a monobloc rim of material of thickness between opposite lateral surfaces of each rim substantially greater than the predetermined thickness adequate to receive upwardly directed fixing screw screwed therein, and wherein the the lower edges of the said metal sheet are in contact with the upper faces of the thick rims bordering longitudinally the closing plate.

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**4,391,342**

## STEERING MECHANISM FOR VEHICLES EQUIPPED WITH POWER STEERING SYSTEM

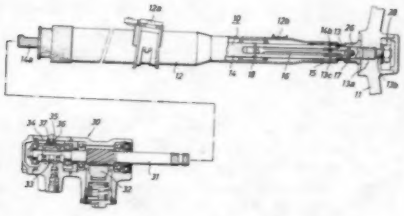
**Masao Nishikawa, Tokyo; Yoshihiko Toshimitsu, Asaka; Toshihiko Aoyama, Saitama; Tokuro Takaoka, Tokyo; Takashi Aoki, and Yoichi Sato, both of Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 2, 1981, Ser. No. 239,492**

**Claims priority, application Japan, Mar. 10, 1980, 55-30729[U]**

**Int. Cl.³ B62D** *5/06, 1/16*

**U.S. Cl. 180—143** **7 Claims**



1. A steering mechanism for a vehicle equipped with a power steering unit producing an increased steering reactive force in proportion to vehicle speed and a resilient element interposed in a path of torque transmission between a steering wheel and said power steering unit, comprising:

a damper means provided between two relatively rotatable members operably associated with each other through said resilient element, whereby torsional vibrations of a first one of said members disposed on the side of said steering wheel, caused by the resiliency of said resilient element and the moment of inertia of said steering wheel, are attenuated;

said damper means comprising two elements adapted to produce a frictional force when one of said elements rotates relative to the other of said elements; and

said two elements of said damper means comprising a ring and a cover fitted on the outer periphery of said ring.

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## RETRACTABLE TRACTED CART

**Frederick A. Deare, 5 Kitchener Ave., Parry Sound, Ontario, Canada (P2A 1R7)**

**Filed Oct. 27, 1980, Ser. No. 201,035**

**Claims priority, application Canada, Nov. 29, 1979, 340896**

**Int. Cl.³ B62D** *55/08, 55/26*

**U.S. Cl. 180—198** **12 Claims**

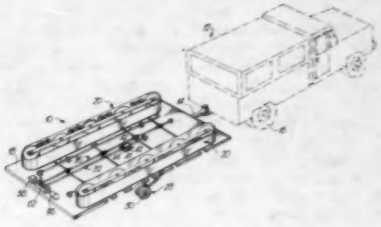
1. A convertible traction device for use with a vehicle having at least two drive wheels, comprising:

a trailer for towing behind said vehicle and having a platform sized to receive the vehicle, hitch means and a road wheel assembly;

first means for selectively moving said road wheels between an operative ground engaging position and a retracted position, relative to said platform;

traction means for each side of said trailer and including a traction belt and belt supporting means;

second means for selectively pivotally moving the traction means between a retracted position above said platform and an operative ground engaging position outboard of the adjacent road wheel;



means for locking said traction means and said road wheels in their respective operative and retracted positions; and

drive means in said platform, engageable by the vehicle drive wheels, for driving said traction means when the vehicle is on the platform and the traction means are in their operative position.

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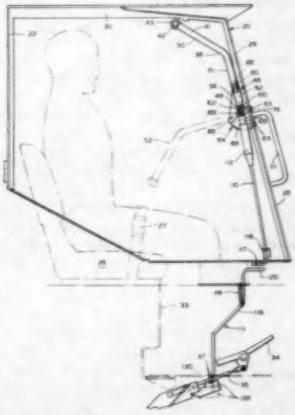
## LOADER OPERATOR RESTRAINT

**Henry J. Weber, Osks; Lonnie D. Hoechst, Gwinner; James R. Christensen, and Verne C. Watts, both of Lisbon, all of N. Dak., assignors to Clark Equipment Company, Buchanan, Mich.**

**Filed Jan. 26, 1981, Ser. No. 228,534**

**Int. Cl.³ B60R** *21/10, 25/06*

**U.S. Cl. 180—271** **17 Claims**



1. A loader including:

a power operated working implement;

control apparatus having a plurality of operative positions for supplying power to the working implement and at least one neutral position where power is not supplied to the working implement, the control apparatus capable of manipulation by the operator of the loader for placing the control apparatus in any one of the operative positions or the neutral position;

an operator restraint member having an engaged position for securing the operator in the loader during operation and a disengaged position for releasing the operator to permit him to leave the loader;

a lock assembly in operative cooperation with the control apparatus and the restraint member for locking the control apparatus in the neutral position when the restraint member is in its disengaged position, the locking assembly including a locking member connected with the restraint member, the locking member having a terminal end that is moved in a first direction when the restraint member is moved from its disengaged position to its engaged position and moved in a second direction when the restraint member is moved from its engaged position to its disengaged position, the locking assembly further including a locking device in operative association with the locking member for selective locking engagement with the control apparatus, the locking device being pivotally movable to an unlock position with the control apparatus when the terminal end of the locking member is moved in its first direction, the locking device being pivotally movable to a lock position spaced from the control apparatus when the terminal end of the locking member is moved in the second direction;

a cab portion;

a cab seat for the operator located in the cab portion;

the restraint member including a generally U-shaped seat bar having two end portions and a bent center section, each of the end portions of the seat bar being pivotally connected to the cab portion at axially aligned pivot points, and the bent center section being radially displaced from an axis defined by the pivot points;

a friction device operatively associated with one of the pivot points;

said one pivot point including aligned openings in the cab portion and the seat bar and further including a pin inserted through the aligned openings;

the friction device including a spring mounted on the pin and a friction washer urged by the spring into engagement with the seat bar;

the bar including a pair of mounting ears rigidly mounted to one end of the bar and one of said mounting ears having an opening therethrough;

the cab portion including a rigidly attached bracket mounted on a side post of the cab portion;

the bracket having first and second sections;

the first section mounted on the side post and the second section disposed angularly from the first section and the side post;

said second section having an opening therethrough alignable with the opening in said one mounting ear;

the pin being insertable through the aligned openings in said one mounting ear and the second section of the bracket; and

the spring mounted on the pin biasing the second section and said one mounting ear together so that the bar remains in the rotative position selected by the operator until repositioned by the operator.

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**ELEVATABLE SCAFFOLD**

**Jim N. Paul, 2737 S. Broadway, Tyler, Tex. 75701**

**Filed Feb. 13, 1981, Ser. No. 234,353**

**Int. Cl.³ E04G 1/22; B66F 3/22**

**U.S. Cl. 182—141** **16 Claims**

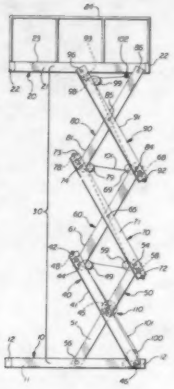
1. An elevatable scaffold including a base and a platform connected therebetween by a lift assembly movable between a collapsed position and extended positions for elevating said platform above said base, said lift assembly comprising:

a series of elongated structural assemblies each pivoted at one end and the middle thereof to some other structural assembly in said series;

a cable passing substantially parallel with some of said structural assemblies and between the ends of mutually pivoted structural assemblies, one end of said cable being secured near the end of one of said structural assemblies;

winch means mounted on said base and the other end of said cable wound thereon so that operation of said winch means may effect said elevating of said platform by further winding of said cable thereon; and

means engageable by said cable when said lift assembly is in said collapsed position for providing a mechanical advantage in initiating the movement of said lift assembly toward said extended positions, comprising a sheave assembly mounted near the midpoint of one of the lower-



most of said elongated structural assemblies and including at least first and second sheave members engageable by said cable between said winch means and one end of said one of the lowermost of said elongated structural assemblies, forcing a portion of said cable to assume an inclined path from said first sheave member toward said one end of said one of the lowermost of said elongated structural assemblies for creating a vertical force, upon operation of said winch means, to initiate movement of said lift structure from said collapsed position toward said extended positions.

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**LOUD-SPEAKER**

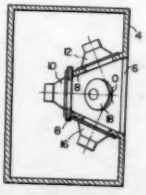
**Naoyuki Murakami, 12-2-704, Kyuden 2-Chome, Setagaya-Ku, Tokyo-To, Japan, and Hiroshi Zyo, Tokyo, Japan, assignors to Naoyuki Murakami, Tokyo, Japan**

**Filed Sep. 30, 1980, Ser. No. 192,187**

**Claims priority, application Japan, Oct. 4, 1979, 54-127325; Aug. 30, 1980, 55-120187**

**Int. Cl.³ H05K 5/00**

**U.S. Cl. 181—147** **2 Claims**



1. A loudspeaker, comprising:

(a) a casing for accommodating therein speaker units, said casing being enclosed by walls on all four sides and back side, except for the front part;

(b) a baffle board provided at the open front part of said casing, said baffle board having an opening formed therein opening into the ambient, said opening lying in a plane substantially parallel to the said back wall and being symmetrical about a line perpendicular to said back wall;
(c) a plurality of speaker fitting panels mounted around and behind said opening formed in said baffle board at an angle to said baffle board diverging in the direction of said opening, and a back fitting panel mounted on said speaker fitting panels parallel to said back wall; and
(d) a plurality of speaker units intensively mounted on said speaker fitting panels around and behind said opening in said baffle board, and a back speaker unit mounted on the said back fitting panel, the total area of the entire diaphragms of said speaker units being substantially equal to, or larger than, the area of said opening in said baffle board, the sound wave radiating direction of said speaker units mounted on said speaker fitting panels being concentrated on a single imaginary point behind the plane of said opening in the baffle board, hence within the ambit of the space defined by said speaker fitting panels and on the said line perpendicular to the back about which the said opening is symmetrical, and the sound wave radiation direction of said back speaker unit being alone said line.

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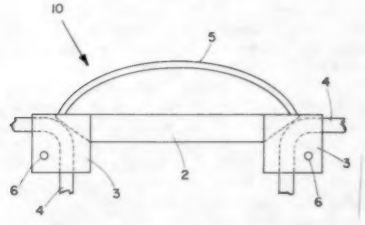
**4,391,347**

## SAFETY DEVICE FOR LADDER ACCESS OPENING TO AN ELEVATED PLATFORM

**John M. Cronan, Baton Rouge; Joseph M. Haynes, Baker, and Darrell D. Jones, Brusly, all of La., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed May 18, 1981, Ser. No. 264,878**
**Int. Cl.³ E04G *9/10, 5/00***
**U.S. Cl. 182—113** **2 Claims**




1. A safety device for that portion of an elevated platform, including a horizontal guard railing, to which an open access ladder is attached, comprising an elongated, rigid member adapted to form an extension of the horizontal portion of the guard railing, and means for connecting the elongated member to the platform railing including a pair of plates rigidly fastened to each end of the elongated member, and means for securely connecting each pair of plates at each end of the elongated member together below the guard railing at a point where the horizontal sections of the railing bend down to attach to the platform or where the vertical support posts converge together with the horizontal section of the railing, whereby the ends of the safety device can be locked to the railing above and on each side of the platform access opening of the platform ladder.

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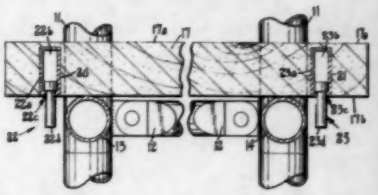
## SCAFFOLD SAFETY PIN

**Ronald L. Rieland, 963 S. Orient Ave., Fairmont, Minn. 56031**

**Filed Sep. 16, 1981, Ser. No. 302,843**
**Int. Cl.³ E04G *5/08, 1/15***
**U.S. Cl. 182—119** **9 Claims**



1. Safety apparatus for scaffolds, comprising:
(a) a scaffold having a platform and at least a pair of generally horizontally extending support members beneath said platform spaced a first distance apart, said platform having opposing surfaces;
(b) a pair of openings in said platform through one surface extending generally normal to said one surface;
(c) safety pin means mounted within each said opening comprising a hollow cylinder having a pin freely mounted therein for limited movement between a retracted position with respect to said one surface and an operative position extending out of said opening beyond said one surface such that with said platform disposed with said one surface facing downwardly said pins are moved by gravity to said operative positions, and with said platform disposed with said one surface facing upwardly said pins are moved by gravity to said retracted positions; and
(d) said openings being located a distance apart with respect to said first distance such that sliding movement of said platform in either direction will cause at least one of said pin means, in the operative position, to encounter a support member to prevent further sliding movement thereof.

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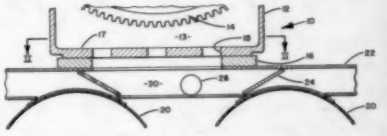
## TURBOMACHINE LUBRICATING OIL SYSTEM

**Alexander A. Carroll, Greensburg, and William F. Hannan, III, Pittsburgh, both of Pa., assignors to Carrier Corporation, Syracuse, N.Y.**

**Filed Mar. 24, 1980, Ser. No. 133,063**
**Int. Cl.³ F01M *1/00***
**U.S. Cl. 184—6.26** **2 Claims**



1. A turbomachine lubricating oil system comprising:
a casing defining a chamber having a plurality of apertures in the bottom;
a relatively large diameter member mounted within said chamber and rotating therein with said member being cooled and lubricated via a spray of lubricating oil which drains from said casing via said plurality of apertures;
structural support means for said casing including a generally hollow member defining a plenum having inlet means communicating with the interior of said chamber via a plurality of apertures to receive the lubricant flowing therefrom and outlet means;

a separate lubricating oil reservoir located in spaced relation to said structural support means, and

means connecting said reservoir with said outlet means, the size of said plenum when compared to the size of said outlet means being such that lubricant flowing into said plenum will collect and form into a quiescent pool before draining therefrom.

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**4,391,350**

## STRUCTURE FOR MOUNTING A BRAKE PAD ABRASION DETECTOR

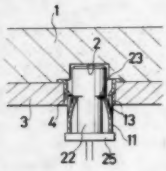
**Michio Moriya, Hyogo, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Aug. 15, 1978, Ser. No. 933,941**

**Claims priority, application Japan, Sep. 20, 1977, 52-127282[U]**

**Int. Cl.³ F16D 66/02**

**U.S. Cl. 188—1.11** **10 Claims**




1. A structure for mounting an electrical brake pad abrasion detector, of the type in which a through hole is formed in a backing plate in such a manner as to communicate with a blind hole formed in a brake pad, wherein the improvement comprises:

a cylindrical holding member fixedly secured in said through hole, said holding member having at least one no-return pawl provided on the inner periphery thereof, said pawl having an end disposed within said cylindrical holding member;

a substantially cylindrical probe having head and leg sections meeting to form a shoulder at the intermediate portion of said probe, said probe being inserted into said holding member so as to allow the end of said at least one no-return pawl to engage with said shoulder to thereby hold said probe; and

the diameter of a portion of said holding member, extending from the vicinity of the end of said at least one no-return pawl to one end of said holding member adjacent said head section, being made larger than that of a remaining portion thereof.

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**4,391,351**

## PARKING DISC BRAKE ACTUATOR

**Norman F. Jirousek, Garfield Heights, and William M. Shipitalo, Novelty, both of Ohio, assignors to Towmotor Corporation, Mentor, Ohio**

**PCT No. PCT/US80/01673, § 371 Date Dec. 12, 1980, § 102(e) Date Dec. 12, 1980, PCT Pub. No. WO82/02077, PCT Pub. Date Jun. 24, 1982**

**PCT Filed Dec. 12, 1980, Ser. No. 273,885**

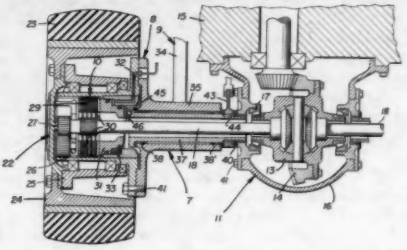
**Int. Cl.³ B60T 1/06**

**U.S. Cl. 188—18 A** **7 Claims**

1. In a power train subassembly (8) for a vehicle having a frame (9), a support assembly (35) rigidly affixed to the frame (9), a wheel drive assembly (22) rotatably mounted on the support assembly (35), a differential (11) having a jack shaft (18) extending therefrom and a brake (10) operatively associated with said wheel assembly (22) and actuatable between an engaged and disengaged condition, comprising:

a support tube (37,50) connecting said differential (11) to said support assembly (35), said support tube (37,50) being axially rotatable relative to said jack shaft (18); and

means (45,46) for converting axial rotation of said support




tube (37,50) into lateral motion and mechanically actuating the brake (10) between said engaged and disengaged condition, said means for converting (45,46) being connected to said support tube (37,50).

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**4,391,352**

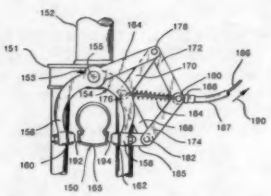
## BRAKE SYSTEM AND APPARATUS AND METHOD THEREFOR

**Lawrence G. Brown, 1629 Kuhilani St., Honolulu, Hi. 96816**

**Filed Feb. 2, 1977, Ser. No. 765,062**

**Int. Cl.³ B62L 1/14**

**U.S. Cl. 188—24.12** **23 Claims**




1. A brake system for a bicycle or the like, having frame means for supporting a bicycle rider and rotatable wheel means for enabling movement of frame means and bicycle rider, and comprising:

brake pad means made from a substantially incompressible non-ferrous material having an effective coefficient of friction in both dry and wet operating conditions and having a friction surface engageable with the wheel means for generating a frictional braking force against the wheel means effective in both dry and wet operating conditions;

a pair of brake pad support arm means of equal effective length and being pivotally movably mounted relative to the frame means and the wheel means in juxtaposition to the wheel means for uniform equal length movement relative thereto and for supporting said brake pad means for uniform equal length movement between a non-braking position in maximum equally outwardly spaced relationship to the wheel means with each friction surface spaced equally outwardly of the wheel means and an inwardly displaced braking position with each friction surface in frictional engagement with the wheel means to apply braking force thereto;

hand operated braking force generating means mounted on the frame means and operably connected to said brake pad support arm means for operation of said brake pad support arm means and for generation of braking force by the bicycle rider;

force increasing means operatively associated with said brake pad support arm means and said brake pad means

for uniformly equally increasing the brake force generated by the bicycle rider and for providing a relatively high uniform equal applied braking force on said brake pad means to generate sufficiently high effective braking force between said brake pad means and the rotatable wheel means in both dry and wet operating conditions;

said force increasing means comprising: linkage means and connecting means and operating means arranged and connected to said support arm means for causing relative rapid initial movement of said support arm means and said brake pad means a relatively large distance from said non-braking position toward said braking position at relatively low mechanical advantage, and for causing relatively slow final movement of said support arm means and said brake pad means a relatively short distance toward the braking position at relatively high mechanical advantage and to generate relatively high uniform equal applied braking force in the braking position; and

said force increasing means comprising formed spring wire means being operably connected to said hand operated force generating means and being operatively associated with said brake pad support arm means for movement between a non-braking position by application of braking force generated by the bicycle rider and for causing movement of said brake pad support arm means between the non-braking position and the braking position.

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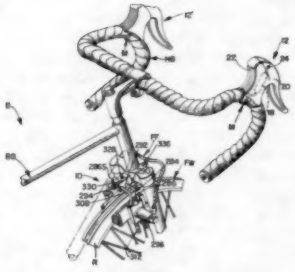
**4,391,353**

## HAND OPERATED HYDRAULIC BICYCLE BRAKE

**William R. Mathauser, 3000 "B" Ave., Anacortes, Wash. 98221**

**Filed Jan. 23, 1981, Ser. No. 227,925**
**Int. Cl.³ B62L** *1/10, 3/02*
**U.S. Cl. 188—24.12** **17 Claims**



1. A hand actuated hydraulic brake for a bicycle comprising:

a hand actuated master cylinder mounted on the handlebars of a bicycle;

a flexible fluid line connected to said master cylinder; and

a brake pad holder unit mounted on the bicycle, said brake pad holder unit including a mounting fastener connected to such bicycle, a mounting clamp pivotably mounted on said mounting fastener, a bracket arm on said mounting clamp, first and second bicycle brake housings mounted on said bracket arm to be on opposite sides of a bicycle front wheel, said housings each being of a size commonly found on a bicycle, a lug mounted on said first housing, a fluid actuated brake arm moving means mounted on said first housing and a first brake pad mounted on said second housing, said brake arm moving means including a rolling diaphragm fluidly connected to said master cylinder by said flexible fluid line via said lug to exchange hydraulic fluid therewith, a movable brake pad holder having a projecting arm thereon, said arm being slidably mounted on said first housing and engaged against said rolling diaphragm for movement therewith, said rolling diaphragm including a closed bottom portion contacting said brake pad holder arm, a side portion adjacent to said first housing and a connecting portion connecting said diaphragm bottom and side portions so that said rolling diaphragm can fold upon itself within said bicycle brake housing and a lip on an end of said side portion remote from said bottom, said lip being captured between said first housing and said lug, said sufficient flexibility to operate efficiently in a bicycle hydraulic brake unit, an arm return means engaged against said rolling diaphragm to bias said diaphragm against action of hydraulic fluid forced thereinto by said master cylinder, and a second brake pad mounted on said movable brake pad holder.

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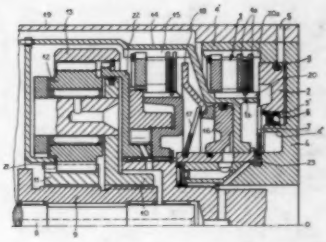
## PISTON-AND-CYLINDER ASSEMBLY FOR HYDRAULIC DISK CLUTCH OR BRAKE

**Manfred Bucksch, Friedrichshafen, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Fed. Rep. of Germany**

**Filed Apr. 1, 1981, Ser. No. 250,025**
**Claims priority, application Fed. Rep. of Germany, Apr. 2, 1980, 3012791**
**Int. Cl.³ F16D** *55/40;* **F01B** *7/20;* **F16D** *19/00*
**U.S. Cl. 188—71.5** **4 Claims**



1. In a fluidically operated speed-changing assembly comprising a cylinder with an annular working space, an annular piston axially slidable in said working space under pressure of an operating fluid, a stack of interleaved first and second annular friction plates confronting said piston, said first friction plates being positively linked with said cylinder, said second friction plates being positively linked with a relatively rotatable member to be coupled with said cylinder by fluid pressure forcing said piston against said stack, and spring means in said cylinder resisting a displacement of said piston toward said stack,

the improvement wherein said piston occupies only part of said working space, leaving an annular clearance radially offset from said stack, and an ancillary ring is slidable independently of said piston in said clearance under pressure of said operating fluid while bearing only upon said spring means without coming into contact with said stack.

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**4,391,355**

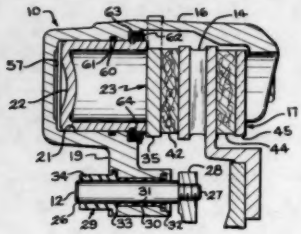
## SLIDING CALIPER DISC BRAKE

**Anthony C. Evans, Northville, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.**

**Filed Dec. 3, 1979, Ser. No. 99,392**
**Int. Cl.³ F16D** *65/00*
**U.S. Cl. 188—73.44** **6 Claims**

1. An improved disc brake for engaging a rotatable disc having an axis of rotation and inboard and outboard frictional surfaces, said disc brake comprising two pins, means for affixing said pins to a stationary structure member inboard of said disc to extended parallel to and radially spaced from said axis with said pins spaced apart, a caliper extending over the periphery of said disc and having inboard and outboard legs, means mounting said inboard caliper leg to slide axially on one

of said pins, an outboard brake pad, means mounting said outboard brake pad on said outboard caliper leg, said outboard brake pad moving into and out of frictional engagement with said outboard frictional surface as said caliper moves axially on said one pin, an inboard brake pad, means mounting said inboard brake pad to slide axially on the other of said pins into



and out of frictional engagement with said inboard frictional surface, said inboard caliper leg defining a cylinder opening towards said inboard pad, and piston means located in said cylinder for moving said inboard pad against said inboard frictional surface when a fluid is introduced into a chamber defined between said cylinder and said piston.

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## CLUTCH ENGAGEABLE/DISENGAGEABLE BY MOMENTARY ENERGIZATION OF SOLENOID MEANS

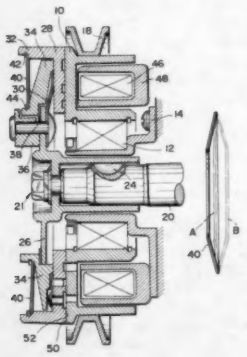
**Toji Takemura, and Kenzo Hirashima, both of Yokosuka, Japan, assignors to Nissan Motor Co. Ltd., Yokohama, Japan**

**Filed Mar. 25, 1982, Ser. No. 361,809**

**Claims priority, application Japan, May 21, 1981, 56-76860**

**Int. Cl.³ F16D *27/10***

**U.S. Cl. 192—84 C** **4 Claims**



1. A clutch comprising:

an input element operatively connected to a prime mover for being driven thereby;

a first rotatable clutch element;

a second rotatable clutch element movable with respect to the first clutch element and engageable therewith, said second clutch element being connected to said input element for synchronous rotation therewith;

first biasing means for biasing said second clutch element away from said first clutch element when in a first state thereof, and for biasing said first and second clutch elements together when in a second state thereof;

an electromagnet associated with said first clutch element for attracting said second clutch element to said first clutch element and inducing said first biasing means to assume said first state when energized with a first predetermined current; and

means responsive to the energization of said electromagnet with a second predetermined current which is higher than said first predetermined current for reversing the state of said first biasing means from said second state to said first state and for causing said first and second clutch elements to separate.

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**4,391,357**

## COUPLINGS

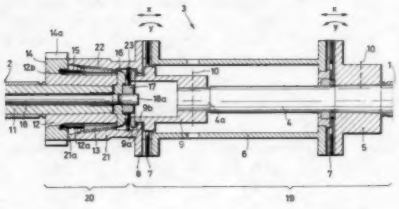
**Ali Bindernagel, Wermelskirchen; Helmut Holthoff, Düsseldorf, and Hartmut Diel, Monchen-Gladbach, all of Fed. Rep. of Germany, assignors to Friedrich Kocks GmbH & Company, Hilden, Fed. Rep. of Germany**

**Filed Jan. 21, 1980, Ser. No. 114,114**

**Claims priority, application Fed. Rep. of Germany, Feb. 14, 1979, 2905560**

**Int. Cl.³ F16D *19/00***

**U.S. Cl. 192—94** **22 Claims**



1. An engageable and releasable rotary coupling for the non-relatively rotatable interconnection of two rotary machine parts the coupling comprising two coupling halves, one said coupling half including a screw-threaded member having an external taper thread, the other of said coupling half including a sleeve having a complementary internal taper thread screwably receiving the external taper thread of said one half to act as a coupling means for transmitting torque from one machine part to the other, the screw-threaded member and the screw-threaded sleeve being axially movable towards and away from one another, means associated with one of said machine parts axially moving one of said coupling halves generally axially relatively to the other thereby enabling a drive for one of the two machine parts and a brake device for the other machine part to be used in conjunction for engaging and releasing and coupling, said coupling having means by which the screw-threaded member and the screw-threaded sleeve can be pushed axially one into the other before the commencement of the rotary movement for the purpose of the coupling operation, one of said member and sleeve being connected to its rotary machine part so as to be non-rotatable relative thereto and being displaceable to a limited extent in an axial direction relative to its rotary machine part against the force of a spring, and the other abutting against an alignment stop on its connected rotary machine part, whereupon the displaceable screw-threaded member or the screw-threaded sleeve is screwably engaged with the respective countermember upon commencement of the rotary movement.

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**4,391,358**

## HARDWARE PRESS AND PUNCH APPARATUS

**Virgil J. Haeger, 1144 Post Rd., Oakdale, Calif. 95361**

**Filed Nov. 5, 1980, Ser. No. 204,200**

**Int. Cl.³ B23Q *11/00***

**U.S. Cl. 192—130** **7 Claims**

1. A hardware press for assembling fastenening devices or punching holes in sheetmetal hardware devices and incorpo-

rating safety provisions to prevent injury to the operator, comprising:

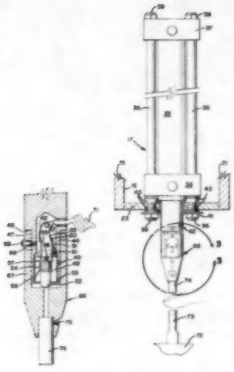
(a) a base structure;

(b) a pedestal assembly on the base structure and including a cantilever arm portion projecting laterally therefrom;

(c) a pressure-exerting ram assembly mounted on said cantilever arm adjacent the free end thereof and including a hydraulic cylinder and a double-acting ram operatively associated therewith and selectively movable through a predetermined excursion along its longitudinal axis, said ram assembly being electrically insulated from said cantilever arm on which it is mounted;

(d) an anvil mounted on said pedestal and underlying said ram assembly;

(e) an upper tool holder slidably mounted on said ram in electrically conductive interrelation therewith and adapted to removably support a selected upper tool thereon;



(f) a lower tool holder mounted on said anvil in electrically conductive interrelation therewith and adapted to removably support a selected lower tool thereon in cooperative relation to said upper tool; and

(g) control means for normally selectively advancing said ram under a predetermined high hydraulic pressure to bring said upper and lower tools together into a predetermined pressure exerting relationship upon a workpiece interposed therebetween with a pressure injurious to the operator if imposed on the operator's hand while automatically stopping advance of the ram if the operator's hand is encountered between the upper and lower tool holders;

(h) said control means including a normally-open safety switch operatively interposed between said ram and said upper tool holder and operable to close a circuit to stop the advance of the ram when a non-conductive element, such as the operator's hand, is encountered with sufficient force to slidably displace said upper tool holder to close said normally-open switch.

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**4,391,359**

**SAMPLE SPLITTER**

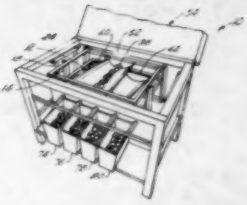
**Joseph A. Lapointe, 223 Sprindale Ave., Pointe Claire, Quebec, Canada**

**Filed Dec. 22, 1980, Ser. No. 219,268**

**Int. Cl.³ B65G *13/00***

**U.S. Cl. 193—23** **7 Claims**

1. A sample splitter for particulates or small elements comprising at least one chute slopped downwardly from a rear end towards a discharge end, means for oscillating said chute on a substantially horizontal path substantially perpendicular to the axial center line of said chute, said chute being substantially symmetrical on opposite sides of said axial centre line, side walls on said chute on opposite sides of said centre line, said side walls being slopped upwardly in a manner such that the material forming said sample moves with a rolling or sliding action in a zig zag path on said chute and without significant bouncing of the material down said chute as said chute is



oscillated, an elongated V-shaped plow at the discharge end of said chute to intercept material issuing from said chute, the line forming the apex of said V-shaped plow being substantially in alignment with axial centre line of said chute when said chute is at the mid-point of its oscillation.

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**4,391,360**

**MACHINE FOR HANK DRAWING AND DOFFING**

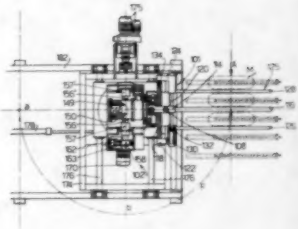
**Federico Minnetti, Pieve A Nievole, Italy, assignor to Officine Minnetti Di Ornella Raveggi & C.S.a.s., Pieve A Nievole, Italy**

**Filed Sep. 16, 1980, Ser. No. 187,638**

**Claims priority, application Italy, Mar. 14, 1980, 20669 A/80**

**Int. Cl.³ B65G *47/24***

**U.S. Cl. 198—412** **31 Claims**



1. A machine for removing yarn hanks from hank carriers and for unloading the removed hanks onto container means, said machine comprising:

plier means for removing yarn hanks from hank carriers, said plier means including a fixed center rod and two side rods, the side rods being movable towards the center rod at the two opposite sides thereof for simultaneous gripping of two hanks and being movable away from said center rod for releasing gripped hanks; and

pliers operating means for controlling said gripping and said releasing movements.

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**4,391,361**

**HOLD-DOWN APPARATUS FOR CABLE CONVEYORS**

**Benjamin O. Hall, and Thomas W. Arndt, both of Oskaloosa, Iowa, assignors to Intraco, Inc., Oskaloosa, Iowa**

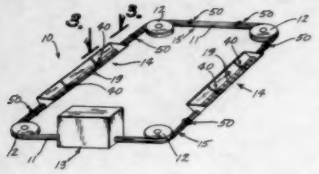
**Filed Jun. 4, 1981, Ser. No. 270,629**

**Int. Cl.³ B65G *19/28***

**U.S. Cl. 198—735** **6 Claims**

1. In a conveying apparatus of a type including a flexible endless member, material engaging means disposed on said flexible endless member for catching material and moving the

material in response to movement of the flexible endless member and said material engaging means, channel means disposed at least partially around said flexible endless member and said material engaging means for confining material for transportation from place to place, said channel means having a pair of opposed sidewalls, and means for selectively causing said flexible endless member to be pulled through said channel means, an improvement comprising:



means for resiliently engaging said material engaging means to bias said material means into said channel means, said resilient engaging means being secured to an upper portion of said pair of opposed sidewalls and comprising a mounting bracket attached to said opposed sidewalls and a loop shaped spring member secured to said mounting bracket; said spring member extending into said channel means for resiliently pushing against said material engaging means.

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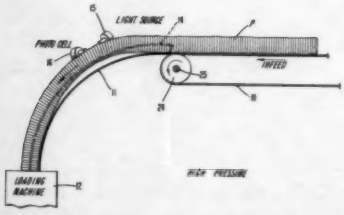
**4,391,362**

## SPEED CONTROLLED INFEED CONVEYOR SYSTEM

**Louis A. Spinelli, West Milford, N.J., assignor to Nabisco Brands, Inc., Parsippany, N.J.**

**Filed Feb. 17, 1981, Ser. No. 234,680**
**Int. Cl.³ B65G *43/08***
**U.S. Cl. 198—855** **3 Claims**




1. A speed controlled conveyor system for transporting a continuous column of abutting articles, said system comprising a generally horizontal infeed conveyor having an output end, a curved chute aligned with said output end and extending in a downward arc, a product handling device removing articles from the lower end of the chute, said chute being open on the side thereof facing upward and forward to permit the curved column of articles on the chute to bow outwardly when axial pressure within the column builds due to the infeed rate exceeding the removal rate, means for measuring the outward displacement of the curved column on the chute and producing a first electrical signal proportional to that displacement, a motor driving said infeed conveyor and speed control means responsive to the first signal for adjusting the speed of said motor, said means for measuring the displacement of said curved column including a light source directing a light beam so as to be progressively intercepted by the column as it bows outwardly, and a photocell for detecting the degree to which said light beam is intercepted by said column, said speed control means including a variable output magnetic clutch having an electromagnetic control coil, means producing a second electrical signal proportional to the speed of the input conveyor, and means for summing said first and second signals and producing a third signal proportional to the difference between a reference voltage and the sum of said first and second signals.

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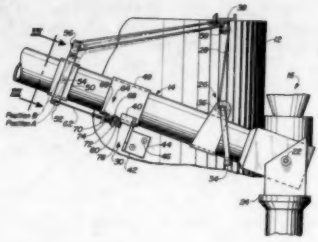
**4,391,363**

## AUTOMATIC LATCH FOR UNLOADING AUGER

**T. William Waldrop, New Holland, Pa., assignor to Sperry Corporation, New Holland, Pa.**

**Filed Feb. 18, 1981, Ser. No. 235,395**
**Int. Cl.³ B65G *21/10***
**U.S. Cl. 198—865** **7 Claims**



1. In combination with a container having a movable unloading auger, the improvement comprising:
- means for supporting said auger, said means being a support member connected to said container and extending therefrom;
- a latch arm pivotally mounted on said auger;
- a latch pin connected to said latch arm;
- means for guiding said latch pin to a first obstruction position relative to said support member;
- means connected for raising and lowering said auger, said means including a cable operably connected to pivot said latch arm to move said latch pin between said first position, and a second obstruction free position relative to said support member;
- resilient means for urging said latch pin from said second to said first position;
- means for limiting movement of said latch pin to said second position;
- said latch pin being moved from said first position to said second position when the tension in said cable overcomes the force of said resilient means; and
- said latch pin being moved from said second position to said first position when the force of said resilient means overcomes the tension in said cable.

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**4,391,364**

## AUTOMATIC LATCH FOR UNLOADING AUGER

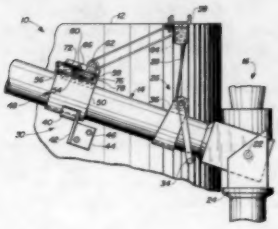
**Terry A. Young, Lititz, and Aquila D. Mast, Lancaster, both of Pa., assignors to Sperry Corporation, New Holland, Pa.**

**Filed Feb. 18, 1981, Ser. No. 235,396**
**Int. Cl.³ B65G *21/10***
**U.S. Cl. 198—865** **11 Claims**

1. In combination with a container having a movable unloading auger, the improvement comprising:
- means for supporting said auger, said means being a support member connected to said container and extending therefrom;
- a latch arm movably mounted on said auger;
- a latch arm receiver connected to said container;
- means connected for raising and lowering said auger relative to said support, said means including a cable operably connected to move said latch arm between a first position, in engagement with said receiver, and a second position, out of engagement with said receiver;

resilient means for urging said latch arm from said second position to said first position;

means for guiding said latch arm and for limiting movement of said latch arm in said second position, said means being a guide plate having a latch arm receiving slot formed therein, said latch arm extending through said slot and terminating adjacent said receiver;



said latch arm being moved from said first position to said second position when the tension in said cable overcomes the force of said resilient means; and

said latch arm being moved from said second position to said first position when the force of said resilient means overcomes the tension in said cable.

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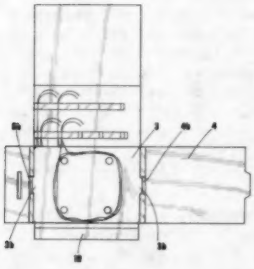
**4,391,365**

## SINGLE DISPENSING MULTIPLE SUTURE PACKAGE

**Jay A. Batchelor, Bethel, Conn., assignor to American Cyanamid Company, Stamford, Conn.**

**Filed May 11, 1981, Ser. No. 262,159**
**Int. Cl.³ A61L *17/02***
**U.S. Cl. 206—63.3** **9 Claims**



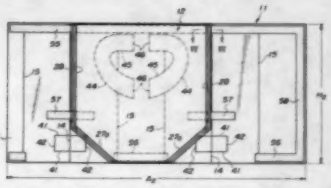
1. A surgical suture package comprising a center panel; at least one foam receptacle affixed to said panel; a plurality of cards placed onto said panel adjacent to said receptacle; a plurality of sutures each singly contained in a non-tangling configuration over a major portion of each card wherein the area surrounded by said configuration comprises an area larger than the remaining portion of the card; a first flap placed onto said cards; means for attaching said first flap to said cards and to said panel; and a second flap foldably attached to said panel and placed onto said receptacle and said first flap, whereby said sutures can be contained with at least one end of each suture contained by said receptacle.

**4,391,366**

## FOLDABLE CUP

**Isao Hirata, Sagamihara, Japan, assignor to Tokai Metals Company Limited, Yokohama, Japan**

**Filed May 5, 1981, Ser. No. 260,843**
**Claims priority, application Japan, Feb. 9, 1981, 56-16847**
**Int. Cl.³ B65D *5/46, 5/54, 5/56, 85/72***
**U.S. Cl. 206—218** **7 Claims**



1. A foldable cup comprising:

a substantially tubular outer shell made of a stiff material and having longitudinally spaced opposite ends and two overlapping lateral edges extending between said ends, said shell being foldable along longitudinal fold lines parallel to said lateral edges to collapse said shell to a substantially flat condition, said cup including a pouch made of a flexible material disposed within said outer shell for accommodating contents, said pouch comprising a pair of opposing body walls bonded to the inside of said outer shell and having bottom wall portions foldable to lie between said body walls when said pouch is collapsed to a flat condition, said bottom wall portions having bottom edges flexibly connected to bottom edges of said body walls, respectively, and each bottom wall portion having a common edge flexibly joining said bottom wall portions together, said body walls and said bottom wall portions each being connected along lines extending obliquely from upper portion thereof with respect to said longitudinal fold lines toward the bottom edges of said respective body walls, said pouch including longitudinal lateral edges along which said body walls are flexibly connected, said lateral edges of said pouch extending from the upper edges of said body walls to a point intersecting the obliquely extending lines, the distance between said lateral edges of said pouch being substantially equal to the distance between said lateral edges of said outer shell, the distance between the upper and bottom edges of said pouch when folded being substantially equal to the distance between the upper and bottom edges of said outer shell, the distance between said common and bottom edges of said bottom wall portions of said pouch and the length of said obliquely extending lines being such that when said outer shell and pouch are unfolded, said bottom wall portions lie within the bottom edge of said outer shell, said lateral edges of said body walls of said pouch having opposing inner surfaces which are bonded together and folded exteriorly over onto one of said body walls of said pouch, the resulting folded portion of said lateral edges of said pouch being bonded to the adjacent body wall in the vicinity of said upper edge of said body wall of said pouch.

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**4,391,367**

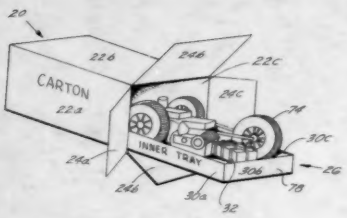
## PACKING CONTAINER

**Lucio C. Perego, 4835 Campbell Ct., Fort Wayne, Ind. 46804**

**Filed Apr. 29, 1981, Ser. No. 258,876**
**Int. Cl.³ B65D *5/50, 85/00***
**U.S. Cl. 206—315 R** **23 Claims**

1. A packing device comprising a packing container having one or more wall portions, an auxiliary packing receptacle within the volume of said packing container mounted adjacent to one of said wall portions and having a first access opening

registrable with a second access opening in said one wall portion, said receptacle includes means for retaining one or more articles therein, said one wall portion having a manipulable closure for the second opening therein, said one wall portion




including a first sheet-like element, a second sheet-like element overlying said first element and having a third opening therein, said receptacle being received by and carried within said third opening and having a laterally extending flange-like portion interposed between said elements.

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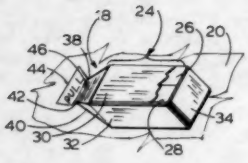
**4,391,368**

**PACKAGING AND DISPENSING SYSTEM**

**Leroy Washington, Jr., 143 Ironwood Cir., Sierra Vista, Ariz. 85635**

**Filed Apr. 9, 1981, Ser. No. 252,301**
**Int. Cl.³ B65D *83/00, 33/00***
**U.S. Cl. 206—484** **1 Claim**




1. A system for packaging and distributing predetermined increments of flowable material, comprising: a web, a plurality of discrete containers on said web in a predetermined pattern, means for opening each container individually, means providing for separation of one or more containers with a part of said web from the remainder of said containers and web, said means for opening providing for opening to either one of two predetermined sizes of opening depending on direction of opening by said means for opening, said means for opening including a tapered side with widening and narrowing portions on said container, and a pull-tab affixed across said tapered side at a location intermediate the length of said tapered side in position for being pulled in a direction producing a widening opening by breaking free said widening portion of said tapered side when pulled toward said widening portion of said tapered side, and alternatively for being pulled in a direction producing a narrowing opening by breaking free said narrowing portion of said tapered side when pulled toward said narrowing portion of said tapered side.

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**4,391,369**

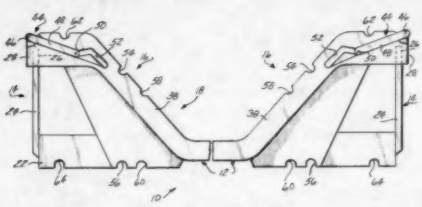
**FOUR-LEVEL STACKING CONTAINER**

**Edward L. Stahl, Brighton, and Elsmer W. Kreeger, Allegan, both of Mich., assignors to Pinckney Molded Plastics, Inc., Pinckney, Mich.**

**Filed Aug. 31, 1981, Ser. No. 298,063**
**Int. Cl.³ B65D *21/06***
**U.S. Cl. 206—506** **3 Claims**

1. In an open topped, stackable container including a bottom, a pair of end walls projecting upwardly from said bottom at opposite ends thereof, said end walls having means thereon accommodating the vertical nesting of one of said containers within another like container in a fully nested storage relationship, and bale means on said end walls selectively locatable in any of a plurality of positions relative to said end walls to selectively establish different depths to which said another like container may be nested within said one container;

the improvement wherein said bale member comprises an elongate rod-like bale member extending parallel to each end wall, crank means fixed at one end to each end of said bale member, aligned pivot means for establishing a pivotal axis parallel to and offset from said bale member at the opposite end of said crank means from said bale member, coupling means on said end walls receiving said pivot means for pivotal movement of said bale member about said axis relative to the associated end wall and for sliding movement wherein said bale member is movable relative to said end walls in directions normal to said axis, said coupling means including means defining at least two spaced stable rest positions of said pivot means relative to



said end wall, means on said end wall selectively engageable with said bale member when said pivot means is in any one of said stable rest positions to establish two alternative rest positions of said bale member at different levels relative to said end wall for each of the two stable rest positions of said pivot means and

wherein one of said rest positions of said bale member locates said bale member outwardly of vertical alignment with the bottom of said container whereby a like container may be lowered downwardly past said bale member into said fully nested storage relationship, said bale member when located in any of its three other rest positions being located in overlying relationship with said bottom of said container, and means defining a series of three spaced bale member receiving notches in the bottom of said container respectively located in vertical alignment with said three other bale member rest positions, whereby a like container may be stacked upon said container at any of four different levels as determined by the rest position occupied by said bale member.

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**4,391,370**

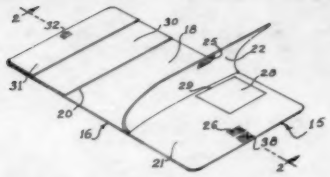
**EMBROIDERY PROJECT ACCESSORY CARRYING CASE**

**Lorraine E. Dalbo, Atlanta, Ga., assignor to Dal-Craft, Inc., Tucker, Ga.**

**Filed Mar. 16, 1981, Ser. No. 243,895**
**Int. Cl.³ A45C *15/00, 7/00***
**U.S. Cl. 206—574** **7 Claims**

1. A carrying case for needlework materials including a backing sheet having an inside surface and an outside surface, said backing sheet comprising a flexible center section, a first end section at one side of said flexible center section and contiguous with said flexible center section, a second end section at the opposite side of said flexible center section and contiguous with said flexible center section, a first storage pocket carried by said inside surface of said first end section, and a second storage pocket carried by said inside surface of said second end section, said flexible center section being foldable adjacent to said storage pockets, said second end section being

foldable towards said inside surface along a line adjacent to said second storage pocket after said first end section is folded towards said inside surface along a line adjacent to said first storage pocket so that said second end section is disposed with said inside surface of said second end section overlying said outside surface of said first end section, and fastening means to



selectively retain said second end section in position over said first end section, said flexible center section having sufficient length to provide storage space between said inside surface of said flexible center section and said first storage pocket, said storage space being continuous with the inside of said second storage pocket.

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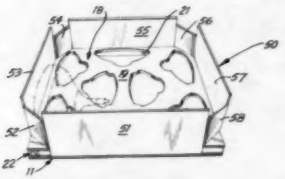
**4,391,371**

## FIBERBOARD SHIPPING CONTAINER HAVING LAMINATED SPACING MEMBERS

**William G. Sieffert, Joliet, Ill., assignor to Champion International Corporation, Stamford, Conn.**

**Filed May 13, 1982, Ser. No. 377,695**
**Int. Cl.³ B65D *85/42***
**U.S. Cl. 206—597** **6 Claims**



1. A fiberboard container for enclosing and protecting at least one article, said container comprising:

opposed top and bottom trays disposed in spaced parallel relationship, each said tray comprising rectangular base and article receiving pads defined by front, rear and opposed side edges, said pads being of substantially identical dimensions and being disposed in spaced parallel relationship such that the respective front, rear and side edges thereof are in register, said article receiving pads being further defined by at least one opening corresponding to the shape of the article, said trays being disposed such that the article receiving pads thereof face each other, and spacers extending between and connected to said pads in each said tray; and

an octagonal sleeve extending between and separating said top and bottom trays, said sleeve including substantially rectangular front, rear and opposed side panels extending between the front, rear and opposed side edges respectively of the base pads, four substantially rectangular connecting panels extending between said article receiving pads and angularly aligned with respect to the front, rear and opposed side edges thereof, two said connecting panels foldably connecting said front panel to said side panels, and the remaining two connecting panels foldably connecting said rear panel to said side panels, whereby the front, rear and opposed side panels of said sleeve maintain said top and bottom trays in register while said connecting panels maintain a fixed spacing between said top and bottom trays, thereby enclosing and protecting the article.

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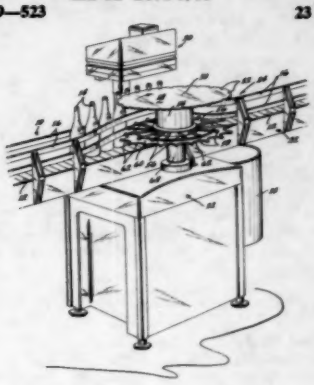
**4,391,372**

## VACUUM STARWHEEL

**Fredrick L. Calhoun, Rolling Hills, Calif., assignor to Industrial Dynamics Company, Ltd., Torrance, Calif.**

**Continuation of Ser. No. 738,824, Nov. 4, 1976, abandoned. This application Apr. 3, 1978, Ser. No. 893,243**
**Int. Cl.³ B07C *5/00***
**U.S. Cl. 209—523** **23 Claims**



1. A mechanism for transferring individual containers from one input position to one of at least two output positions, including:

a first member continuously movable in a particular path including at least one port and including means extending from the member and communicating with the port and constructed to retain one of the individual containers for movement with the first member when a vacuum is applied to the part,

a second stationary member including at least first and second parts disposed in the path of movement of the first member for movement of the first port in the first member into sequential communication with the first and second ports in the second member,

means defining a source of vacuum,

means operatively coupled to the vacuum source and to the first and second ports in the second stationary member for producing vacuum in the first and second ports,

the first and second ports in the second member being elongated in the path of movement of the first member and the length of the port in the first member being less than the length of the first and second ports in the second member to provide a vacuum with the retaining means in the first member for holding the container during the communication of the port in the first member with the ports in the first and second members,

means for providing a source of at least atmospheric fluid pressure,

the second stationary member including at least third and fourth ports disposed in the path of movement of the port in the first member for communication with the port in the first member at least a portion of the time during the movement of the first member, the third port being intermediate the first and second ports and the fourth port being positioned after the second port in the direction of movement of the port in the first member, the third port communicating with either the vacuum means or the pressure means, the fourth port communicating with the pressure means, the movable member providing a transfer of the individual container for release at the position of the

third port when the third port communicates with the pressure means or for release at the position of the fourth port when the third port communicates with the vacuum means,

the size of the first port in the first member in the path of movement of the first member being greater than the shortest distance between the second and third ports but less than the respective distance between the first or second ports and the side of the third port on the far side of the first and second ports in the path of movement of the first member,

means for providing a continuous movement of the first member in the particular path,

means for testing particular parameters on the container for particular characteristics during movement of the first member with the first port on the first member in communication with the first port on the second member at an intermediate position along the length of the first part, and

means for providing a communication of the third port on the second member with a particular one of the vacuum means and the pressure means, in accordance with the characteristics of the particular parameters tested on the container by the testing means, during the communication of the first port on the first member only with the third port on the second member.

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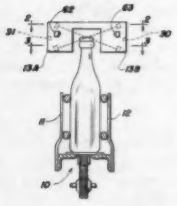
**4,391,373**

## METHOD OF AND APPARATUS FOR COMPENSATING SIGNAL DRIFT DURING CONTAINER INSPECTION

**Edmund C. Wiggins, Pinellas County, Fla., assignor to Barry-Wehmiller Company, St. Louis, Mo.**

**Filed Nov. 10, 1980, Ser. No. 205,600**
**Int. Cl.³ G01N *21/32*; G06M *7/00*; H01J *39/12***
**U.S. Cl. 209—526** **4 Claims**



1. In apparatus for the inspection of containers movable through an inspection zone, said apparatus having a plurality of radiant energy beam emitters and detectors oriented on the container passage in the inspection zone, such that said emitters and detectors are aligned in cooperating pairs to produce output signals from said detectors corresponding to container inspection values and to values during intervals between container movement through the inspection zone, the improvement of processing circuit means connected to said emitters and detectors including:

(1) subcircuit means for storing the signal values generted each time during intervals between container movement in the inspection zone and means for adjusting the stored signal values to generate threshold signal values, said subcircuit means comprising an analog to digital signal converter, a memory circuit means connected to said analog to digital output, and a digital to analog signal converter, and

(2) subcircuit means for comparing the output signal values from said detectors during each container inspection directly with said adjusted threshold signal values, whereby each output of the analog to digital signal converter is compared with the value of the signal previously stored in said memory circuit means for determining the need to update the stored signal values for signal drift compensation.

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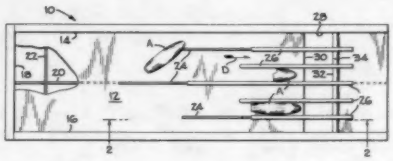
**4,391,374**

## METHOD OF AND APPARATUS FOR SEPARATING ELONGATED ARTICLES BY LENGTH

**Robert A. Krynock, Indiana, Pa., assignor to FMC Corporation, Chicago, Ill.**

**Filed Oct. 5, 1981, Ser. No. 308,297**
**Int. Cl.³ B07C *5/02***
**U.S. Cl. 209—540** **10 Claims**



1. A separator comprising a vibratory surface for conveying elongated articles longitudinally thereon, said surface having a slot with upstream and downstream edges extending transversely of the direction of articles travel, a plate projecting within the slot near the upstream edge to form a surface over which articles slide, said plate having a downstream edge that together with the downstream edge of the slot defines a grading gap through which articles of short length drop, and means mounting the plate independently of the vibratory surface whereby articles conveyed by the surface decelerate when sliding across the plate before reaching the grading gap.

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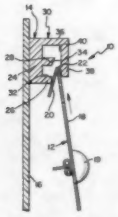
**4,391,375**

## DISPLAY CARD AND ASSEMBLY HANGER

**Robert D. Joyce, Greenville, R.I., assignor to Joyce Card & Display Co., Providence, R.I.**

**Filed Apr. 27, 1981, Ser. No. 257,908**
**Int. Cl.³ A47F *7/00***
**U.S. Cl. 211—13** **9 Claims**



1. A display assembly for jewelry and the like comprising:

a. a substantially vertically disposed card having a main portion and an outwardly biased flap hingedly attached to the top edge thereof extending downwardly and outwardly therefrom; and

b. a hanger for suspending said card comprising;

i. support means engageable with the bottom edge of said flap to support said card;

ii retaining means engageable with the side of said card opposite from said flap to retain the bottom edge of said flap in engagement with said support means; and

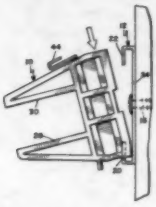
iii fulcrum means engageable with said flap at an intermediate point in its extension causing said flap to be hinged inwardly toward said card when said flap is pressed against said fulcrum means.

**4,391,376**

## RESILIENT CLAMP FOR SUPPORTING ARTICLES

**Charles C. Finnegan, Escondido, Calif., assignor to LeLasso Corporation, San Diego, Calif.**

**Filed Dec. 15, 1980, Ser. No. 216,620**
**Int. Cl.³ A47F 7/00; E21B 19/14**
**U.S. Cl. 211—60 SK** **8 Claims**



1. Apparatus for clampably supporting articles, comprising:
a mounting base for being secured to a supporting structure incorporating a pair spaced inwardly directed opposed projections,
said mounting base comprising a strap member, having a flat central mounting section and end sections that are spaced from said central mounting section and comprising in their terminal portions said opposed projections;
a clamping member for removable mounting on said mounting base,
said clamping member comprising a resilient mounting section incorporating opposed outwardly directed openings sized to receive said projections,
said outwardly opposed openings comprising a channel through said mounting section,
said channel being elongated in a plane that is parallel, in the mounted position, to the plane of said central mounting section;
said resilient mounting section being compressible to a length permitting said section to pass between said opposed projections and expandable to engage said opposed projections,
a pair of opposed clamping elements extending from said mounting section for receiving an article therebetween,
an elastic cord having end connectors for encircling said clamping elements and an article received between said clamping elements to resiliently urge said clamping members toward one another,
said elastic cord being received through the channel in said mounting section,
said end connectors comprising a hook member,
said hook member comprising at least one deformable clamping strap means for being compressed onto an end of said cord, and having a hook section extending from said strap clamping means;
said cord and strap clamping means being receivable in said channel in said mounting section,
said hook section having a cross section larger than said channel and protruding therefrom when said cord and strap are received in said channel.

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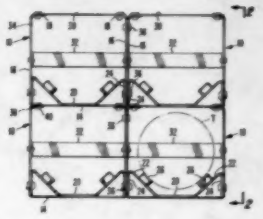
**4,391,377**

## KNOCK-DOWN ASSEMBLY FOR SUPPORTING OXYGEN TANKS

**Theodore Ziaylek, Jr., P.O. Box 292, Yardley, Pa. 19067**

**Filed Mar. 19, 1981, Ser. No. 245,408**
**Int. Cl.³ A47F 7/28**
**U.S. Cl. 211—71** **8 Claims**

1. A rack assembly for supporting oxygen tanks and like cylindrical objects, comprising:
(a) a plurality of box sections each of which is of rectangular, three-sided form with one open side and includes a web portion and a pair of sidewall portions extending therefrom, said sections being adapted to be disposed in longitudinally contacting relation;
(b) at least one cradle mounted in each section and adapted to supportably engage an oxygen tank, the web portions of some of the sections closing the open side of adjacent sections;



(c) a cover plate closing the open side of the remaining sections; and
(d) connecting means extending between and fixedly secured together those sections disposed in longitudinally contacting relation.

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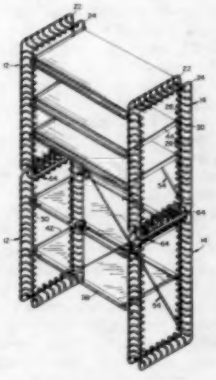
**4,391,378**

## SHELVING CONSOLE FURNITURE

**Edward Secon, Trumbull, Conn., assignor to The Sherwood Corporation, Spring City, Tenn.**

**Filed Oct. 9, 1981, Ser. No. 310,218**
**Int. Cl.³ A47F 5/01**
**U.S. Cl. 211—187** **8 Claims**

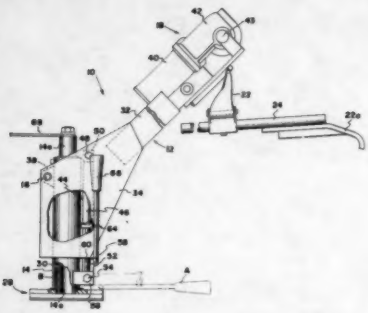


1. A shelving console furniture unit comprising a pair of laterally spaced side frame support standards for supporting the ends of at least one shelf member therebetween, each standard comprising a pair of wire frame members each frame member being identical and having spaced vertical and spaced horizontal portions interconnected to define a border about an opening, a multiplicity of rungs of finite thickness secured to and between each pair of frame members at substantially equally spaced similarly disposed locations about the border and extending into said opening, said shelf member comprising a substantially rectangular frame, a hook outstanding at each corner of said shelf frame having a downwardly disposed portion, each said hook being positionable upon a rung with the downwardly disposed portion projecting between the rung and the adjacent frame members.

## 4,391,379
## LIFTING APPARATUS ADAPTED FOR MOUNTING IN A VEHICLE TRUNK

Edgar C. Paffrath, Birch Run, Mich., assignor to Amigo Sales, Inc., Bridgeport, Mich.

Filed Oct. 14, 1981, Ser. No. 311,411
Int. Cl.³ B66C 23/44
U.S. Cl. 212—187 3 Claims



1. Lifting apparatus adapted to be mounted in an automobile trunk or the like comprising a base plate, adapted to be mounted on a fixed frame, a vertical post fixedly mounted at its lower end on said base plate, a sleeve rotatably supported on said post for free rotation about a vertical axis, an elongate boom, pivot means mounting said boom upon said sleeve for pivotal movement about a horizontal axis located adjacent one end of said boom, power driven lift means mounted on the opposite end of said boom, extensible gas spring means mounted between said sleeve and an intermediate location on said boom gravitationally counterbalancing said boom about said horizontal axis, and releasable lock means mounted on said sleeve and engageable with said gas spring means to positively maintain said gas spring means at a predetermined extended position constituting an elevated lifting position of said boom; said post projecting upwardly beyond the upper end of said sleeve, and brace means for fixedly securing the upper end of said post to said fixed frame; said boom comprising an elongate boom member, a mounting bracket including a pair of spaced plates fixedly mounted on and projecting from said boom member at said one end thereof to receive said sleeve therebetween, said pivot means being coupled to said sleeve and said bracket at the side of said sleeve remote from said boom member, said gas spring comprising a cylinder pivotally mounted at its upper end between said bracket plates at the side of said sleeve opposite said pivot means and a rod projecting from the lower end of said cylinder, said lock means comprising a rigid prop member, second pivot means commonly mounting the lower ends of said rod and said prop member on said sleeve, and a cylinder seat on the upper end of said prop member supportingly engageable with the lower end of said cylinder to maintain a predetermined extension of said rod from said cylinder.

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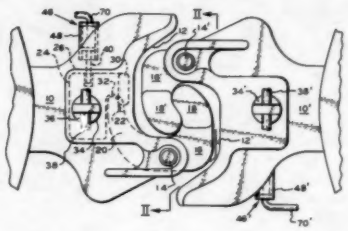
## 4,391,380
## RAIL CAR COUPLER INTERLOCK

Demetrius H. Hoose, 404 Broad St., Michigan Center, Mich. 49254

Filed Feb. 12, 1981, Ser. No. 233,879
Int. Cl.³ B61G 3/04, 3/28, 5/08
U.S. Cl. 213—76 3 Claims

1. In a railroad coupler system for railroad cars utilizing a compressed air brake system wherein the coupler includes a body having a recess defined therein for receiving a coupler knuckle head, a knuckle pivotally mounted upon said body pivotal between open and closed positions with respect to said recess, a locking member mounted upon said body selectively cooperating with said knuckle movable between knuckle locking and knuckle unlocking positions, manual means selectively translating said locking member between knuckle locking and knuckle unlocking positions, the improvement comprising, safety means mounted upon the body selectively engaging the locking member to control movement of the locking member from the locking position to the unlocking position, said safety means comprising an expansible chamber motor mounted upon the coupler body, a piston within said motor having a pressure face and a rod face, a rod affixed to said piston extending from said rod face and having an outer end projecting from said



motor toward the locking member, an air supply conduit communicating with said motor and piston pressure face, a compression spring within said motor engaging said piston rod face, valve means within the compressed air brake system controlling air flow therethrough positionable between open and closed positions and in communication with said air supply conduit whereby closing of said valve means depressurizes said motor permitting said spring to retract said rod and opening of said valve means pressurizes said motor to extend said rod, and a rod receiving recess defined upon the locking member and aligning with said rod upon the locking member being in the knuckle locking position to receive said rod outer end.

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## 4,391,381
## PAINT-COATED BOTTLE

Akiho Ota, and Fumio Negishi, both of Tokyo, Japan, assignors to Yoshino Kogyosho Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 253,635, filed as PCT JP79/00206, Aug. 3, 1979, published as WO81/00391, Feb. 19, 1981 § 102(e) date Mar. 3, 1980, abandoned. This application Feb. 22, 1982, Ser. No. 351,393
Claims priority, application Japan, Feb. 2, 1978, 53-12368
Int. Cl.³ B65D 23/00
U.S. Cl. 215—1 C 3 Claims

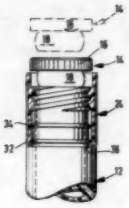
1. A paint-coated bottle formed of a saturated polyester resin, comprising: a chlorinated primer layer applied to the exterior surface of the bottle; an acrylic undercoat layer applied to said primer layer; and a decorative paint layer applied to said undercoat layer, said paint layer being prepared by adding a pigment to titanium nitride.

4,391,382

## CONTAINER HAVING A SAFETY CLOSURE

Werner Emich, Bensheim-Langwaden, Fed. Rep. of Germany, assignor to Friedrich Sanner GmbH & Co. KG, Bensheim, Fed. Rep. of Germany

Filed Mar. 17, 1982, Ser. No. 359,072
Claims priority, application Fed. Rep. of Germany, Mar. 18, 1981, 3110514
Int. Cl.³ B65D 55/02
U.S. Cl. 215—213 20 Claims



1. In combination: a container, especially a container of glass, metal or plastic material for pharmaceutical preparations or chemicals, said container having a tubular neck and an open mouth surrounded by an end face, a stopper adapted to be pushed into the mouth of the container neck and having a grip plate with a bottom surface limiting the extent to which the stopper can be inserted into the neck and also having a circumferential surface permitting grasping of the stopper by a person, and a safety sleeve projecting above the end face of the container neck, being disposed externally on the container neck and having a projecting portion conformingly receiving the circumferential surface of the grip plate of the stopper in the closed position of the container, the bottom surface of the grip plate resting upon an annular circumferential radial surface of the safety sleeve, screw-threaded sections on said sleeve and said container neck in the complementary engagement with one another over a limited distance when looking in the opening direction of the stopper and being secured against axial separation from one another, the safety sleeve having at least one projection directed radially inwardly from an inside surface thereof, said projection being snapped over a first annular bead on the outside surface of the container neck, said first annular bead being directed radially outwardly and situated ahead of the projection when looking in the opening direction of the stopper.

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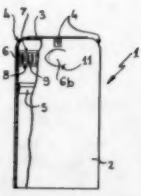
4,391,383

## OVERSEALING CAPS

Pierre Babiol, Villefranche sur Saone, France, assignor to Societe Nouvelle de Bouchons Plastiques S.N.B.P., Anse, France

PCT No. PCT/FR79/00105, § 371 Date Jul. 7, 1981, § 102(e) Date Jul. 7, 1981, PCT Pub. No. WO81/01399, PCT Pub. Date May 28, 1981
PCT Filed Nov. 13, 1979, Ser. No. 280,001
Int. Cl.³ B65D 41/48
U.S. Cl. 215—256 4 Claims



1. A capping capsule with a thin wall comprising a closed end and an axially extending skirt including a circumferential tear-off guarantee strip which is joined at its upper and lower edges to the skirt at two rupture lines defined by two circumferential grooves extending around the inside of the skirt and separated by the height of the guarantee strip, and the guarantee strip including on its inner face multiple circumferentially spaced axially extending ribs, the thickness of each rib decreasing abruptly near its ends and blending into the rupture lines.

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4,391,384

## AUTOMOBILE BODY PANEL HOLE CLOSURE

Dan T. Moore, III, and Michael F. Fischer, both of Cleveland Heights, Ohio, assignors to Dan T. Moore Co., Cleveland, Ohio

Filed Dec. 14, 1981, Ser. No. 330,483
Int. Cl.³ B65D 41/00
U.S. Cl. 220—359 11 Claims

1. A closure for a hole in a panel such as a body panel in an automotive vehicle, comprising a plate having dimensions complementary to and somewhat larger than the hole, means for attaching the plate to the panel, a gasket having dimensions at least as large as the hole, the gasket being of an elastomeric material responsive to the application of heat to expand to a relatively high degree, means attaching the gasket to the plate prior to assembly with the panel hole, the heat expansion capacity of the gasket being sufficient to ensure that any gaps existing between the plate and the opposed areas of the panel surrounding the hole permitted by the plate attaching means and resulting from manufacturing tolerances in the fabrication of the panel hole and plate are closed.

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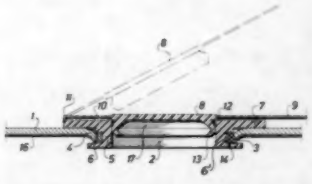
4,391,385

## CLOSING ARRANGEMENT

Hans Rausing, Lund, Sweden, assignor to Tetra Pak Developpement SA, Pully, Switzerland

Filed Aug. 20, 1981, Ser. No. 294,440
Claims priority, application Sweden, Aug. 20, 1980, 8005840
Int. Cl.³ B65D 39/00
U.S. Cl. 220—307 15 Claims



1. A closing arrangement for containers which have at least one plane end wall and an aperture therein, comprising:

a unitary closing body insertable into the aperture, said closing body including:

flange means for retaining said closing body in the aperture,

a container-emptying channel in said closing body, and

cover means sealed to said closing body for closing said channel in said body; and a separate

seal means located on an outer periphery of said closing body for sealing against an edge of the aperture, said seal means including an annular layer of a material softer than

said body in which material said edge of the aperture becomes embedded.

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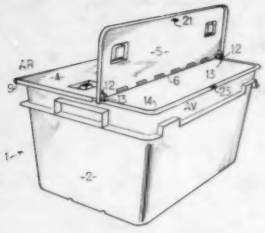
**4,391,386**

## HANDLING CASE WITH INCORPORATED FOLDABLE LID

**Michel Moret, Ermont, France, assignor to Allibert S.A., France**

**Filed Jan. 20, 1982, Ser. No. 340,926**
**Claims priority, application France, Jan. 21, 1981, 81 01034**
**Int. Cl.³ B65D *43/14, 51/04***
**U.S. Cl. 220—343** **7 Claims**



1. A handling case entailing a lid hinged to the body of the case along one of its edges along a hinge formed toward the upper edge of the case, characterized in that the said lid (3) is divided into two parts (4, 5) hinged one to the other about a second hinge (6) parallel to the first hinge (9), respectively forming a rear part (4) articulated around the said first hinge (9) on the said edge of the case, and a front part (5) hinged to the said rear part (4) of the lid about the said second hinge (6), the said front part (5) including, in the vicinity of the ends of the said second hinge (6), hook-shaped or similar parts (12) which in the tipped position of the lid are locked into slots (13) formed in corresponding positions along the edge (14) of the case, the said front part (5) also including conventional locking mechanisms (21, 22) to lock the lid onto the case.

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**4,391,387**

## MAGNETIC TICKET DISPENSER

**Robert T. Bayne, Carmel, and Phillip E. Shireman, Martinsville, both of Ind., assignors to Standard Change-Makers, Inc., Indianapolis, Ind.**

**Continuation of Ser. No. 71,921, Sep. 4, 1979, Pat. No. 4,326,643. This application Jun. 29, 1981, Ser. No. 278,741**
**The portion of the term of this patent subsequent to Apr. 27, 1999, has been disclaimed.**
**Int. Cl.³ B65H *3/14***
**U.S. Cl. 221—13** **2 Claims**

1. Apparatus for dispensing rectangular tickets or the like comprising:

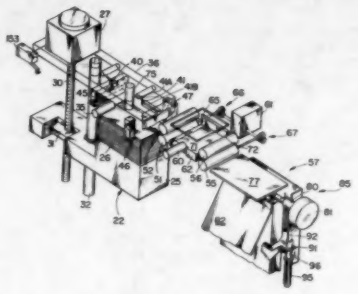
a container having a vertically extending opening therein with a rectangular horizontal cross section adapted to loosely receive a stack of tickets, said container having a top and a ticket passage slot adjacent thereto and leading from said opening to the outside of said container;

an elevator mounted for vertical movement in said container and adapted to support the stack of said tickets;

means for operating said elevator to position the uppermost ticket thereon slightly below said top;

said container having air jet orifices therein, a first of which is located in the container side wall on the opposite side of said container from said slot, said first orifice extending toward the side of the stack of tickets below the uppermost tickets, a second of said orifices being located in said container top on the opposite side of said container from said slot, and a third of said orifices being located in said continer top above said slot;

means for providing a blast of air under pressure through said first orifice to break apart the tickets in the stack and through said second and third orifices to move a ticket from the top of the stack of tickets out of the container through said slot; and



controller means for electronically timing and sequencing the air under pressure from said air jet orifices.

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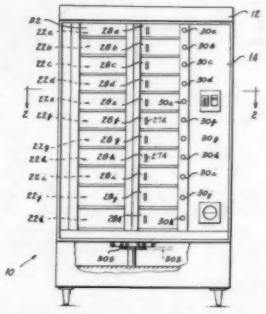
**4,391,388**

## CONTROL SYSTEM FOR INCREASING THE VERSATILITY OF AN ALL PURPOSE MERCHANDISER

**Merrill Krakauer, 1 Deer Path, Short Hills, N.J. 07078**

**Filed Apr. 30, 1981, Ser. No. 258,937**
**Int. Cl.³ G07F *11/54***
**U.S. Cl. 221—76** **8 Claims**



1. In a merchandising machine, apparatus including a cabinet formed with a plurality of vertically aligned access openings leading into the interior of said cabinet, a plurality of normally locked doors associated with said openings, a merchandise carrier comprising a plurality of levels of compartments each adapted to receive merchandise, means mounting said merchandise carrier for movement as a unit around a vertical axis with said merchandise levels respectively at the heights of said openings, drive means adapted to be energized to move said carrier, a plurality of selecting means corresponding respectively with said levels, respective first control means associated with said selecting means and adapted to be set to energize said drive means in response to actuation of associated selecting means for a period of time to move said carrier to position the next full compartment of the level corresponding to the actuated selecting means behind its associated opening and to stop said carrier in said position, respective second control means associated with said selecting means and adapted to be set to energize said drive means in response to actuation of the associated selecting means to permit the customer stationarily to position any compartment of the corresponding level behind the level opening, means for selectively setting one of said first

and second control means of each level to cause the level to operate in a first-in first-out mode or in a shopper mode, and means including said control means and coin responsive means for releasing a door behind which a compartment containing selected merchandise has been positioned.

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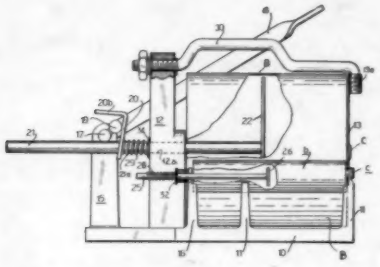
**4,391,389**

## ADJUSTIBLE ACTUATOR FOR PLURAL DISPENSING DEVICES

**Giuseppe Catalfamo, Via Sanvito, 14, Varese, Italy**

**Filed Mar. 19, 1981, Ser. No. 245,392**
**Claims priority, application Italy, Apr. 8, 1980, 21240 A/80**
**Int. Cl.³ B67D *5/52***
**U.S. Cl. 222—135** **18 Claims**



1. In a dispensing device, a combination comprising:
first means for holding containers for at least two substances to be dispensed at a preselected ratio to one another, said containers each being of the type having one end provided with a stationary end wall and a second end provided with a movable end wall which is slidable toward said one end to effect expulsion of the substance of the container;
second means for effecting the dispensing of said substances, said second means comprising a plurality of linearly movable pusher members, one for each container, each pusher member having a leading end portion adapted to press against and effect movement of one of said movable end walls and further comprising for each of said pusher members an element of rigid strip material having a hole through which the respective pusher member extends, an abutment portion engaging said element spaced from and at one axial side of the pusher member, a spring engaging the element adjacent said pusher member at the opposite axial side and urging the element towards said one side so that the element tilts on the pusher member and the edge portions bounding said hole entrainingly engage the pusher member; and
third means connected with said second means and operative for changing said preselected ratio to a different ratio.

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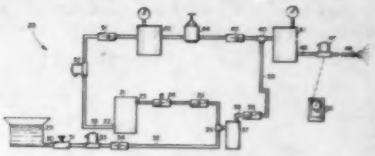
**4,391,390**

## CHEMICAL-MIXING AND DISPENSING APPARATUS

**Arthur G. Howard, 7711 Newport Way, Apt. D., Indianapolis, Ind. 46250**

**Filed Jan. 21, 1981, Ser. No. 226,894**
**Int. Cl.³ B05B *7/26***
**U.S. Cl. 222—136** **12 Claims**

1. A chemical-mixing and dispensing apparatus for providing a volume of a chemical mixture to a dispensing location, said chemical-mixing and dispensing apparatus comprising:
a first chemical container having an inlet port and an outlet port;
a first chemical disposed within said first chemical container;
a source of a second chemical;
flow conduit in flow communication with the outlet port of said first chemical container and with said source of a second chemical, said flow conduit allowing simultaneous passage therethrough of said first and second chemicals;
a fixed-volume chemical mixture holding tank having an outlet port in flow communication with said dispensing location and having an inlet port in flow communication with said flow conduit;



a fixed-volume control tank in flow communication with and between said flow conduit and the inlet port of said first chemical container; and
flow control means for periodically releasing a portion of the contents of said chemical mixture holding tank to said dispensing location.

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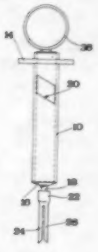
**4,391,391**

## SYRINGE FOR APPLYING ADHESIVE RESIN TO THE JUNCTIONS OF TENNIS RACKET NETTING

**Aldo M. Robaldo, Corso Francia 33, Turin, Italy**

**Filed Nov. 6, 1980, Ser. No. 204,586**
**Claims priority, application Italy, Jan. 11, 1980, 52825/80[U]; Mar. 7, 1980, 53010/80[U]**
**Int. Cl.³ B67D *5/00***
**U.S. Cl. 222—478** **14 Claims**



1. A syringe for applying adhesive resin to the junctions of racket netting, comprising a reservoir cylinder to contain such adhesive resin and an injecting piston to expel adhesive resin from such reservoir cylinder and at least two separate adjacent parallel tubular spray nozzles fluidically coupled with and extending from the end of the reservoir cylinder to provide simultaneous, substantially identical doses of adhesive resin therethrough to such junctions.

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**4,391,392**

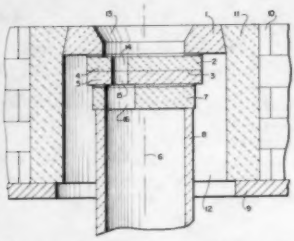
## SLIDING CLOSURE UNIT

**Peter Jeschke, Walluf, and Jürgen Plath, Wiesbaden, both of Fed. Rep. of Germany, assignors to Didier-Werke A.G., Wiesbaden, Fed. Rep. of Germany**

**Filed Aug. 12, 1981, Ser. No. 292,188**
**Claims priority, application Fed. Rep. of Germany, Aug. 20, 1980, 3031377**
**Int. Cl.³ B22D *41/08***
**U.S. Cl. 222—598** **6 Claims**

1. In a sliding closure unit for selectively discharging liquid melt from a liquid melt container of the type including an outer jacket, an inner refractory lining and a pouring opening extending through the lining, said sliding closure unit cooperat-

ing with the container for selectively blocking and unblocking the pouring opening and including a stationary refractory plate having therethrough a flow passage for communication with the pouring opening, a sliding refractory plate in abutting contact with said stationary refractory plate and having therethrough at least one flow passage to be selectively moved into and out of alignment with said flow passage of said stationary refractory plate, said stationary and sliding refractory plates having complementary, abutting relative sliding surfaces, the improvement wherein:



said stationary refractory plate consists essentially of a substantially non-wettable material having a Mohs' hardness of from 1 to 2, a thermal conductivity of greater than 40 W/km at 700° C. and a crushing strength of not greater than 25 N/mm$^2$ at about room temperature; and

said sliding refractory plate consists essentially of a substantially non-porous material having a Mohs' hardness of from 6 to 7, a thermal conductivity of less than 3 W/km at 700° C. and a crushing strength of greater than 300 N/mm$^2$ at about room temperature.

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**4,391,393**

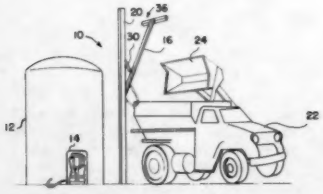
**WETTED SALT SYSTEM INCLUDING ADJUSTABLE TIMER**

**Wm. G. Filmyer, Philadelphia, Pa., assignor to Pioneer De-Icing Services, Inc., Philadelphia, Pa.**

**Continuation of Ser. No. 67,304, Aug. 17, 1979, abandoned. This application Feb. 4, 1982, Ser. No. 345,572**

**Int. Cl.$^3$ B67D *5/02***

**U.S. Cl. 222—642** **1 Claim**



1. In a wetted salt system suitable to extend the melting range of highway salt of the type including a liquid storage tank, a wetting arm pivotally connected at one end to a stationary support and having an unconnected end, the wetting arm comprising an enlongated bar and at least one nozzle supported near the unconnected end of the bar, and means to pivotally function the wetting arm relative to the support between an elevated position and a spray position; a brine pump taking its suction from the storage tank and delivering liquid under pressure to the spray nozzle; a hydraulic circuit to control the operation of the means to pivotally function the arm; an electrical control circuit including a first timer to control the time period the wetting arm remains in the said spray position and a second timer to control the time period of the flow of brine from the pump to the spray nozzle, first radio transmitter and receiver means to initiate the operation of the first timer and second radio transmitter and receiver means to initiate operation of the second timer; the improvement comprising

a third timer connected in parallel to and being adapted to override the said second timer, the third timer including an electrically timed operation cycle and a manual timer adjustment knob, the adjustment knob being connected in the timer to vary the duration of the timed operation cycle, and

manual means connected into the electrical control circuit to bypass the first and second radio transmitter and receiver means, the manual means comprising a flexible electrical cord and a switch, the manual means being adapted to manually function the up and down pivotal movements of the wetting arm and the spray cycle through the spray nozzle from a location remote from the electrical control circuit;

whereby the timed period of brine flow can be manually adjusted without requiring tools.

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**4,391,394**

**METHOD FOR LAYING SHIRTS, ESPECIALLY MEN'S SHIRTS, FOR PURPOSES OF WRAPPING**

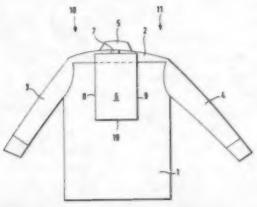
**Rolf Hoffmann, Monchen-Gladbach, Fed. Rep. of Germany, assignor to van Laack, Schmitz & Eltschig GmbH u. Co., Monchen-Gladbach, Fed. Rep. of Germany**

**Filed Jan. 19, 1981, Ser. No. 226,100**

**Claims priority, application Fed. Rep. of Germany, Sep. 26, 1980, 3036277**

**Int. Cl.$^3$ A41H *33/00***

**U.S. Cl. 223—37** **6 Claims**



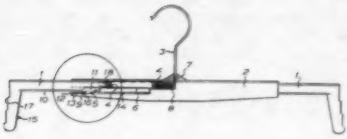
1. A procedure for laying a shirt, in particular a men's shirt, for purposes of wrapping, wherein the shirt yokes are folded-over along mutually parallel folding lines on the back of the shirt and the folded-over yokes lying on each other are fastened by a slipped-on clamp in the area of a beak formed between them, whereupon the shirt sleeves are layed on the folded-over yokes and then the torso end consisting of the front and rear sides and away from the collar is turned-over together with folded-over parts along a folding line extending transversely to the lengthwise direction of the shirt and is further fastened to the front side or to the folded-over parts joining same, characterized in that the folded-over yokes (2, 10, 11) are merely joined together by the clamp (15), in that the folded-over torso end (18) of the shirt (1) that is away from the collar is fastened by at least two pins (22, 23) to the folded-over parts (10, 11), and in that torso end (18) is folded-over so much that a tuck-in end (20) projecting above the upper border (13, 14) is folded about this border (13, 14) of the yokes (2) and is tucked-in behind the yokes (2, 10, 11).

**4,391,395**

## CLOTHES HANGER

**Franz Karner, Lidköping, Sweden, assignor to Karner & Co AB, Lidköping, Sweden**

**Continuation of Ser. No. 37,955, May 9, 1979, abandoned. This application Oct. 23, 1981, Ser. No. 315,303**
**Claims priority, application Sweden, May 11, 1978, 7805391**
**Int. Cl.³ A41D *27/22***
**U.S. Cl. 223—94** **5 Claims**



1. A clothes-hanger comprising a hollow central portion having an outer end and having a slot in the lower region thereof, the slot having a defining edge adjacent to the outer end thereof, said edge being spaced inwardly from the outer end of the central portion, a suspension member disposed on the central portion, said central portion having abutment means centrally therein, two end pieces, at least one said end piece being telescopically in the central portion in order to be movable between an inner and an outer position in the central portion, the outer ends of said end pieces having gripping portions for engagement with an article of clothing which is to be hung up, said one end piece at its inner end having a transverse abutment face, a compression spring disposed between and abutting said abutment means in the central portion and the abutment face of the end piece telescopically disposed in the central portion, recess means in the bottom of said movable end piece adjacent to and spaced from the transverse abutment face thereof, and a locking device resiliently connected at the inner end thereof to said one end piece with its inner end at the inner end of the one movable end piece and having a free outer end remote from said inner ends, said outer end of said locking piece having end surface means for engaging said defining edge of said slot in said central portion, said locking device extending from its inner end towards said gripping portion of the one end piece and underlying said recess means, said recess means being devoid of any obstruction to movement thereinto of said locking means, the locking device having a lower surface inclined downwardly toward the outer end thereof, said locking device positioned when said inner end of said one end piece is partially inserted into said central portion for engagement of the lower surface thereof with the outer end of the central portion whereby resiliently to move said locking device into said recess means in the said one end piece upon initial insertion thereof and whereby after further insertion said locking device will be caused to snap down into said slot formed in said central portion lower region by the resilient connection, the end surface means at the free outer end of said locking device engaging the defining edge of said slot and being urged thereagainst by said compression spring.

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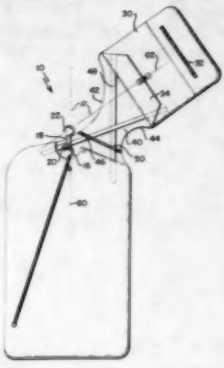
**4,391,396**

## CLOTHING TRAVEL BAG

**Reginald D. Brady, 2524 Boyer Ave. East, Apt. 446, Seattle, Wash. 98102**

**Filed Jan. 26, 1981, Ser. No. 228,132**
**Int. Cl.³ A45F *3/02***
**U.S. Cl. 224—205** **9 Claims**

1. A travel bag for carrying objects, comprising first and second bags interconnected by a relatively thin, flexible web, said web being offset from the center of at least one of said bags to provide clearance for the neck of a user when said travel bag is carried with said web over one shoulder and the first and second bags extend downwardly along the back and chest of the user, said web being secured to said bags in a manner that causes the respective center axes of said bags to intersect each other at an acute angle in the direction that said web is offset from said bag when said bags occupy a common plane so that



said bags are level when they are carried, with said web resting on the shoulder of said user.

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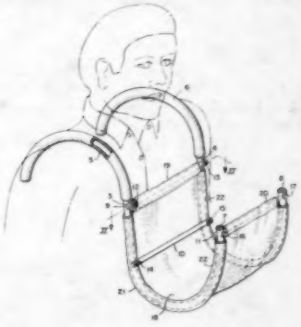
**4,391,397**

## FIREWOOD CARRIER

**William D. Taylor, Jr., P.O. Box 142, King George, Va. 22485**

**Filed Jun. 25, 1981, Ser. No. 277,153**
**Int. Cl.³ A45C *11/00***
**U.S. Cl. 224—265** **1 Claim**



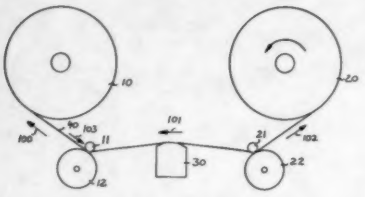
1. A device for carrying wood, particularly firewood, comprising a front-carried frame formed of a pair of rigid, generally S-shaped, tubular elements formed of conventional electrical conduit, spaced apart in parallel planes by a plurality of rigidly attached cross members, the upper curvatures of the S-elements being configured in downwardly-concave C-portions, padded with conventional hot water pipe insulation to rest on the shoulders of the wearer of the device, the lower curvatures of the S-elements being configured in upwardly-concave C-portions to form a receptacle for the transportation of firewood, and the lower curvatures and two cross-members being covered with canvas sleeves attaching to them a canvas sheet which forms a part of the receptacle.

4,391,398

## METHOD OF TENSIONING A TAPE

Heinrich Cap, St. Georgen, Fed. Rep. of Germany, assignor to Papst Motoren GmbH & Co. KG, St. Georgen, Fed. Rep. of Germany

Filed Feb. 19, 1980, Ser. No. 122,684
Claims priority, application Switzerland, Feb. 26, 1979, 1886/79
Int. Cl.³ B65H 23/22
U.S. Cl. 226—4 5 Claims




1. A method of tensioning a tape in a tape recording device, comprising the steps of passing a tape between a braking roller, a first sound shaft, a second sound shaft, and a pulling roller located one after the other so that the tape runs with counteracting pulling forces and slips over the sound shafts; and adjusting the pulling forces of the rollers and the slip of the tape on the sound shafts so that one pulling force of the tape between the braking roller and the first sound shaft, and another pulling force of the tape between the first and second sound shafts act in a direction toward the braking roller, whereas a further pulling force of the tape between the second sound shaft and the pulling roller acts opposite to said direction, and also so that the first sound shaft reduces the one pulling force between the braking roller and the first sound shaft and thereby the other pulling force between the first and second sound shafts is smaller than said one pulling force, and the second sound shaft reduces the other pulling force between the first and second shafts so that the further pulling force between the second sound shaft and the pulling roller is smaller than said other pulling force.

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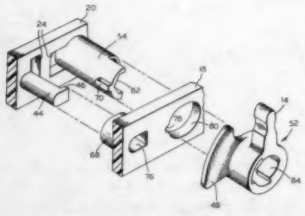
4,391,399

## MANUALLY ASSEMBLABLE SHEET-FEED TRACTOR

Alan F. Seitz, New Hartford, Conn., assignor to Data Motion, Incorporated, Torrington, Conn.

Filed Sep. 25, 1981, Ser. No. 305,492
Int. Cl.³ B65H 17/38
U.S. Cl. 226—74 26 Claims




1. A sheet-feed tractor adapted to be slidably mounted on spaced apart and substantially parallel extending elongated support and drive shafts comprising:

a. a first frame member having a support-shaft opening therein;

b. a second frame member assembled on said first frame member to form a tractor frame therewith;

c. a drive sprocket mounted on said tractor frame for rotation about the axis of said drive sprocket and having an aperture therethrough adapted to receive the drive shaft for sliding therealong and for driving thereby upon rotation of the drive shaft about its longitudinal axis;

d. an endless belt disposed about said tractor frame in engagement with said drive sprocket to be driven thereby upon driving movement of said sprocket by the drive shaft, said drive belt including sheet engagement teeth adapted to engage in the perforations of sheet material perforated against the side margins thereof for advancement thereof upon driving of said belt by said sprocket;

e. clamp means, having an aperture therethrough adapted to receive the support shaft therein, for clamping the support shaft received therein, said clamp means including a first clamp part on said second frame member and extending through said support-shaft opening in said first frame member to the side of said first frame member opposite that on which said second frame member is disposed, said clamp means also including a second clamp part disengageably mounted on said first clamp part and movable relative thereto to clamp a support shaft received in said aperture in said clamp means, said second clamp part bearing against the side of said first frame member opposite said second frame member to retain said first and second frame members in assembly, said frame members being held in assembly by said clamp parts, removal of said second clamp part from said first clamp part permitting ready disassembly of said frame members from each other.

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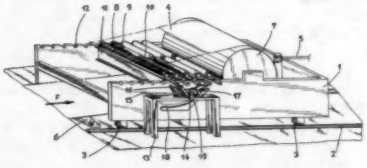
4,391,400

## APPARATUS FOR STORING A VARIABLE LENGTH OF STRIP

Daniel Sylvain, Saint Etienne, France, assignor to Clesid, St. Chamond, France

Filed May 1, 1981, Ser. No. 259,642
Claims priority, application France, May 7, 1980, 80 10215
Int. Cl.³ B65H 17/42
U.S. Cl. 226—113 5 Claims




1. A strip accumulator system of the horizontal type, comprising:

a cart having means for engaging a strip in a fashion to form a horizontal loop, and constructed and arranged to be motivated along a path of travel to increase or decrease the length of said loop,

a number of roller assemblies for supporting and separating an upper portion from a lower portion of said strip of said formed loop,

said cart including means for storing said roller assemblies thereon,

a number of stationary cooperative sets of frames transversely opposed relative to said strip and spaced at selected locations parallel to and on opposite sides of said path of travel in a manner to permit free movement of said cart therealong, and

means activated by said motion of said cart, for the successive removal of said roller assemblies off of said cart and placement thereof onto a different one of said sets of transversely opposed frames and into a working position to support said upper portion of said strip upon said increase of said loop and for successive removal of said

roller assemblies from said sets of frames onto said cart upon said decrease of said loop.

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**4,391,401**

## SURGICAL STAPLERS AND STAPLE

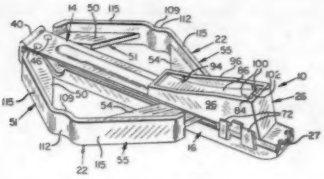
**Jerome F. Mosbofsky, Portland, Oreg., assignor to Lawrence M. Smith, Lake Oswego, Oreg.**

**Continuation of Ser. No. 26,071, Apr. 3, 1979, Pat. No. 4,256,251, which is a continuation-in-part of Ser. No. 899,350, Apr. 24, 1978, abandoned. This application Jan. 26, 1981, Ser. No. 228,620**

**The portion of the term of this patent subsequent to May 17, 1998, has been disclaimed.**

**Int. Cl.³ A61B *17/04***

**U.S. Cl. 227—19** **2 Claims**



1. A surgical stapler comprising:

an elongate body having forward and rearward ends, and having a longitudinally extending guideway opening through its forward end;

a ram having a forming end portion and being mounted in said guideway with said forming end portion adjacent the forward end of the body for sliding movement along the guideway between a forward position with its forming end portion at said forward end and a retracted position with its forming end portion spaced from said forward end;

staple-holding means attached to said body for feeding a staple into said guideway when said ram is in its retracted position;

at least one toggle-joint linkage, said toggle-joint linkage comprising first and second arms of generally equal length, said arms having adjacent ends pivotally attached together with the end of said first arm opposite said adjacent ends being pivotally attached to said body adjacent its rearward end and the end of said second arm opposite said adjacent ends projecting toward the forward end of said body and being pivotally attached to said ram, the adjacent ends of the arms of said toggle-joint linkage being opposed and projecting away from said body when said ram is in its retracted position so that pressing the adjacent ends of the arms of said toggle-joint linkage in a direction transverse of said guideway will move said ram from its retracted to its forward position; and

an anvil fixed to the forward end of said body and projecting across said guideway, said anvil and the forming end portion of said ram being shaped to close a staple therebetween upon movement of said ram to its forward position.

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**4,391,402**

## SURGICAL STAPLING CONTROL MEANS

**Jay E. Campbell, Upper Black Eddy; Richard H. Reichmann, Churchville, both of Pa., and Lehmann K. Lehmann, Fairfield, Conn., assignors to American Cyanamid Company, Stamford, Conn.**

**Continuation-in-part of Ser. No. 153,229, May 27, 1980, abandoned. This application Sep. 26, 1980, Ser. No. 191,653**

**Int. Cl.³ A61B *17/04***

**U.S. Cl. 227—121** **6 Claims**

1. A surgical stapling control means comprising a handle; a trigger pivotally attached and compressible into said handle; a staple forming means contained in the forward portion of said handle; a flexible arm mounted on the rearward portion of said trigger; a pawl and at least one guide pin attached to one end of said arm; a multi-toothed ratchet attached to the rearward portion of said handle; and guide means having upper and lower portions, said guide means positioned adjacent the rearward portion of said handle so as to coordinate with and provide tension to said guide pin, such that on partially compressing said trigger the lower portion of said guide means provides tension on said guide pin and flexes said arm such that the pawl engages said ratchet and such that on complete compression of said trigger, the upper portion of said guide means releases tension from said guide pin allowing said arm to relax and allowing said guide pin to cross over said guide means, thus causing said pawl to be disengaged from said ratchet.

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**4,391,403**

## METHOD OF EXPLOSION-WELDING ROLLING BILLETS INTENDED FOR PACKAGE ROLLING

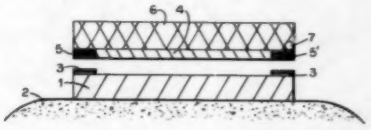
**Ingemar P. Persson, Striberg, Sweden, assignor to Nitro Nobel AB, Gyttorp, Sweden**

**Filed Apr. 13, 1981, Ser. No. 253,822**

**Claims priority, application Sweden, Apr. 23, 1980, 8003071**

**Int. Cl.³ B23K *20/08***

**U.S. Cl. 228—107** **5 Claims**



1. A method of manufacturing a compound plate by explosion-welding, said compound plate being intended for subsequent package-rolling, characterised in that the plating material is smaller in area than the base material so that an edge is left around the periphery of the base material without any plating, that this free edge surface of the base material is protected by the attachment of metal strips, that an explosive charge is placed on top of the plating material, said charge having an area at least as great as that of the base material, after which the explosive charge is detonated.

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**4,391,404**

## SLEEVE VALVE FOR FLEXIBLE BAGS

**Albert Welter, Franklin, Ohio, assignor to Champion International Corporation, Stamford, Conn.**

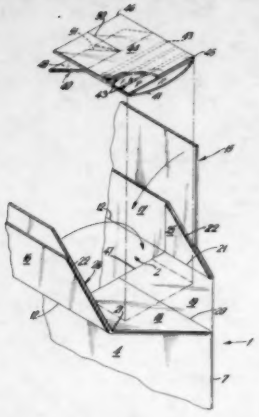
**Filed Aug. 13, 1981, Ser. No. 292,622**

**Int. Cl.³ B65D *30/24***

**U.S. Cl. 229—62.5** **11 Claims**

1. A flexible bag comprising side walls, a top wall and a bottom wall, an open mouth in the corner of said top wall comprising an end flap, a sleeve valve mounted in said open mouth, said sleeve valve comprising a tubular sleeve and a backing panel, the upper front portion of the tubular sleeve being adhered to the backing panel by an adhesive area and the

lower front portion of the sleeve adhered to the end flap of said open mouth of the bag, the upper and lower rear portions of said sleeve being unattached to the backing panel and to said end flap and being adapted to hang within the bag, and a longitudinal slit located exclusively in the upper rear portion of



said sleeve, said slit terminating short of said adhesive area to form an unslit area of said upper rear portion unadhered to said backing panel whereby the said unslit area together with the lower rear portion of said sleeve folds over the open mouth to seal the open mouth in the two-ply region of the sleeve.

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**4,391,405**

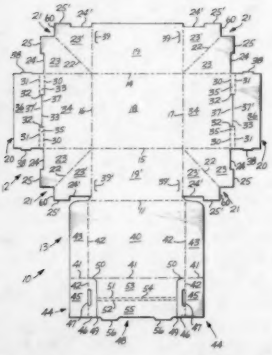
**CONTAINER**

**Alva C. Drinon, Portland, Me., assignor to Weyerhaeuser Company, Tacoma, Wash.**

**Filed Oct. 23, 1981, Ser. No. 314,262**

**Int. Cl.³ B65D *5/24, 5/34***

**U.S. Cl. 229—31 R** **20 Claims**



1. A blank for a container body comprising:

a rectangular base panel,

front and rear panels hingedly attached along score lines to said base panel,

side panels hingedly attached along score lines to said base panel,

four corner panels each hingedly attached by score lines along two adjacent sides to said adjacent side panel and said adjacent one of said front and rear panels,

said corner panels being divided into a pair of gusset panels by a diagonal score line extending from the juncture of said hinged score line of said corner panel

each of said gusset panels having a locking tab extending outwardly from its upper edge, said locking tabs of each pair of said gusset panels being alignable in the erect container body,

a locking panel extending outwardly from each of said side panels, said locking panel being separated from said side panel by a cut line along a portion of the width of said locking panel and said side panel, said cut line separation being alignable with said locking tabs in said erect container body,

said locking panel and said side panel being further separated along at least part of the remainder of their width by a pair of shoulder panels, each said shoulder panel being defined by a pair of parallel score lines which form the hinged joint between said shoulder panel and said side panel and said shoulder panel and said locking panel,

said score line between said side panel and said shoulder panel being aligned substantially with the upper edge of said gusset panel,

the width of said shoulder panel being substantially equal to the combined thickness of a pair of gusset panels,

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**4,391,406**

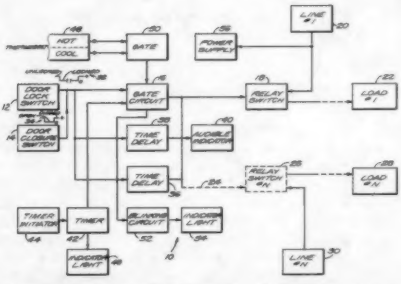
**POWER SAVING SYSTEM WHICH ASSURES ROOM SECURITY**

**Morton Fried, 706 Bolton Rd., Far Rockaway, N.Y. 11691**

**Filed Jan. 7, 1982, Ser. No. 337,701**

**Int. Cl.³ E05B *65/00*; G05D *23/00***

**U.S. Cl. 236—47** **8 Claims**




1. A power saving system for conserving energy consumption by electric loads in a room having a door with a locking system, and which system also assures room security, comprising:

closure switch means for coupling to the door and producing a control signal only throughout the time the door is opened;

lock switch means for coupling to the door locking system and producing a control signal only throughout the time of proper locking of the door, both said control signals being the same;

control means associated with an electric load in the room, and

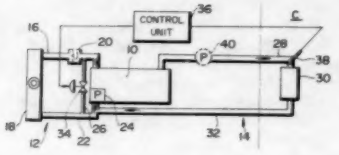
wire means coupling said closure switch means and said lock switch means in parallel to said control means,

said control means comprising timing means responsive to the termination of a control signal on said wire means for producing a control signal for a preset limited interval of time, and for ceasing operations upon the presence of a control signal on said wire means, and control switch means responsive to any of the aforesaid control signals for controlling the energization of the electric load during the time that a control signal is present.

## 4,391,407
## VEHICLE CABIN HEATER

**Sadaharu Nakazawa, Tokyo, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed May 21, 1981, Ser. No. 265,843**
**Claims priority, application Japan, May 22, 1980, 55-69494[U]**
**Int. Cl.³ B60H *1/02***
**U.S. Cl. 237—12.3 B** **4 Claims**




1. A water circuit arrangement of an engine having a water jacket therein, comprising:

an engine cooling circuit including a thermostat valve, a radiator and a water pump connected in series by means having one end connected to an outlet of said water jacket and the other end connected to an inlet of said water jacket;

a bypass passage bypassing both said thermostat valve and said radiator;

a vehicle cabin heating circuit including a passage having one end connected to the outlet of said water jacket and the other end connected to the passage of said engine cooling circuit at a position just upstream of said water pump, and a heater core unit arranged in the passage of said vehicle cabin heating circuit to receive water from the outlet of the water jacket flowing through said heater core unit before reaching said water pump;

valve means arranged in said bypass passage for selectively opening and closing said bypass passage;

temperature sensing means for measuring the temperature of water circulating through said vehicle cabin heating circuit; and

control means for actuating said valve means to close the bypass passage when said temperature sensing means senses a water temperature in the vehicle cabin heating circuit below a predetermined level, and to open said bypass passage when said temperature sensing means senses a water temperature in the vehicle cabin heating circuit above the predetermined level.

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## 4,391,408
## LOW INSERTION FORCE CONNECTOR

**Richard J. Hanlon, Attleboro, Mass., and Rudi O. H. Vetter, Pawtucket, R.I., assignors to Augat Inc., Attleboro, Mass.**

**Filed Sep. 5, 1980, Ser. No. 184,216**
**Int. Cl.³ H01R *13/639***
**U.S. Cl. 339—75 M** **14 Claims**

1. A low insertion force connector for an integrated circuit package having a plurality of terminals arranged in spaced parallel rows, said connector comprising:

a rectangular base member formed with a plurality of apertures along opposite edges thereof;

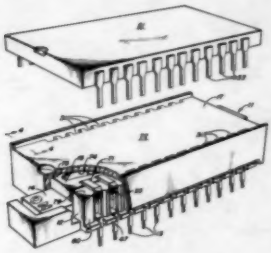
a spring loaded electrically-conductive contact member mounted in each of said apertures, said contact member having only one bearing surface adapted to move without flexure of the bearing surface to coact with an electrically non-conductive surface of a cover to make a single-sided contact with an inserted terminal, said bearing surface having a normal ON position and an OFF position;

a slide member on said base, said slide member being longitudinally movable and having a plurality of upstanding pins on its top surface;

a pair of actuator members on said slide member, each actuator member associated with a different plurality of said apertures, said actuator members having a plurality of elongated first slots arranged at an angle with respect to the direction of longitudinal movement of said slide member, each of said first slots engaging a corresponding pin, said actuators being laterally movable with respect to said base member and said slide member; and

an electrically non-conductive cover engaging said base and enclosing said slide, actuators and a portion of said contact members including said bearing surfaces, said cover being formed with a plurality of openings aligned with said apertures and said contact members in said apertures, said cover being further formed with electrically non-conductive surfaces confronting said contact members and said apertures in said base;

said actuators each having a plurality of second slots arranged in a row along one edge thereof, each of said



contact members being formed with a hook portion engaging a corresponding one of said second slots;

whereby longitudinal movement of said slide member in one direction moves said actuators away from each other to the normal or ON position whereby said bearing surfaces of said contact members are closely adjacent said confronting surfaces of said cover, and longitudinal movement of said slide in a second direction moves said actuators toward each other to the OFF position whereby said bearing surfaces are moved laterally away from said confronting surfaces of said cover; and

whereby the terminals of said integrated circuit package may be easily inserted through said openings and between said bearing surfaces and said confronting surfaces when said connector is in the OFF condition and the terminals are positively confined between said bearing surfaces and said confronting surfaces when said connector is in the ON condition.

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## 4,391,409
## POSITIONING AND CONTROL SYSTEM FOR FAN THRUST REVERSER COWLS IN A TURBOFAN ENGINE

**Klaus H. Scholz, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.**

**Filed Sep. 30, 1980, Ser. No. 192,247**
**Int. Cl.³ F02K *1/60***
**U.S. Cl. 239—265.29** **5 Claims**

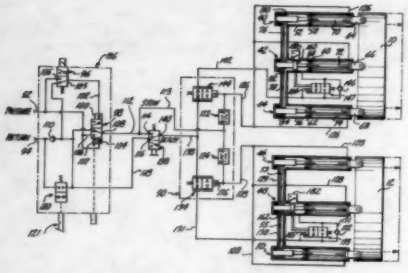
1. A pressurized hydraulic fluid positioning and control system for moving first and second fan thrust reverser cowls in a turbofan engine, said fan thrust reverser cowls being movable in retraction and deployment between a retracted position and a deployed position, respectively, comprising:

first and second hydraulic actuator means coupled respectively to said first and said second reverser cowls for moving said cowls between said retracted and deployed positions, each of said first and second hydraulic actuator means including at least one double-acting hydraulic actuator having cooperative piston and cylinder members and a movable piston rod, said piston rod of said hydraulic

actuator of said first hydraulic actuator means being coupled to said first reverser cowl, and said piston rod of said hydraulic actuator of said second hydraulic actuator means being coupled to said second reverser cowl, each said cylinder member being affixed to said turbofan engine and having a rod end pressurizable to retract said cowls and a head end pressurizable to deploy said cowls;

means for supplying pressurized hydraulic fluid to said first and said second hydraulic actuator means;

directional control valve means for selectively controlling flow of said pressurized hydraulic fluid to and from said first and second hydraulic actuator means to retract or deploy said thrust reverser cowls; and,



first and second flow regulator means respectively coupled to said first and second actuator means for regulating flow of said pressurized hydraulic fluid to and from said first and second actuator means during deployment and retraction of said first and second reveraer cowls, said first and second flow regulator means being operable to regulate the respective rates of flow of hydraulic fluid to and from said first and second hydraulic actuator means to provide substantially synchronous and independent movement of said first and second reverser cowls during retraction and deployment.

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**4,391,410**

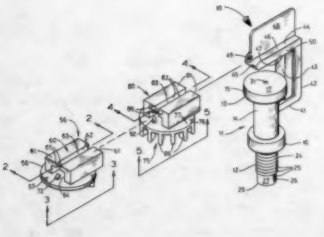
## SPRINKLER WITH TRANSVERSELY MOUNTED SPLASH PLATE

**Allan L. Smith, 26591 Road 196, Exeter, Calif. 93221**

**Filed Mar. 30, 1981, Ser. No. 248,959**

**Int. Cl.³ B05B 1/26**

**U.S. Cl. 239—498** **12 Claims**



1. A sprinkler comprising a body having a fluid passage extending therethrough and communicating with the exterior thereof for the release of a fluid stream therefrom substantially along a predetermined axis, an arm mounted on the body having a portion defining a track disposed in substantially right angular relation to said axis, a splash plate having a predetermined impact point for contact by said fluid stream when the splash plate is in an operating position and a mount engageable with the portion of the arm defining the track for movement of the splash plate along the track to carry said impact point along a path substantially intersecting said axis, and means for interlocking the splash plate and the arm in fixed position relative to each other when said impact point is in substantial coincidence with said axis.

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**4,391,411**

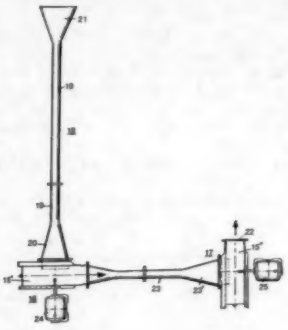
## METHOD AND APPARATUS FOR PULVERIZING MATERIALS BY VACUUM COMMINUTION

**William A. Colburn, Denver, Colo., assignor to Process Development Corporation, Denver, Colo.**

**Filed Dec. 18, 1980, Ser. No. 217,679**

**Int. Cl.³ B02C 19/18**

**U.S. Cl. 241—1** **10 Claims**



1. In a vacuum system for effecting the comminution of minerals and other frangible substances, the method for increasing the rate of pulverization and the fineness of the product which comprises:

producing a low-pressure zone and a continuous flow of air into the zone and a discharge of air from the zone;

providing a mass of material to be pulverized; and

injecting the material into the low-pressure zone at a significant initial velocity produced by a force independent of the force utilized for producing said low-pressure zone, whereby the material is subjected to a sudden corresponding increased rate of change of pressure upon entering said low-pressure zone.

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**4,391,412**

## APPARATUS FOR LIMITING FILLING HEIGHT OF CONTAINERS

**Albert Goldhammer, Zum Hecht 46, 7770 Uberlingen, Fed. Rep. of Germany**

**Filed Oct. 10, 1980, Ser. No. 195,767**

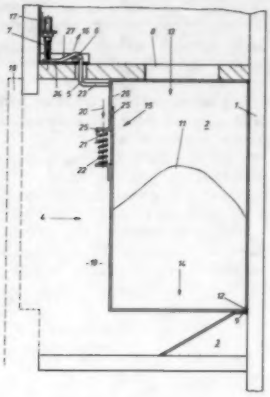
**Claims priority, application Fed. Rep. of Germany, Oct. 18, 1979, 2942241**

**Int. Cl.³ B02C 23/00**

**U.S. Cl. 241—36** **7 Claims**

1. An apparatus for limiting the filling height of a container for a cutting or shredding machine for the destruction of documents and microfilms, a container pivotally mounted in a housing and having a base, a rear end and a front end, the housing supporting the rear end of the container on a horizontal portion of an inclined support extending upwards from the

base of the housing, an upper end of the front end of the container being supported by a spring catch actuating switch means to stop a cutting or shredding machine when a predetermined height is sensed and reached.



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**4,391,413**

## APPARATUS FOR BREAKING ARTICLES

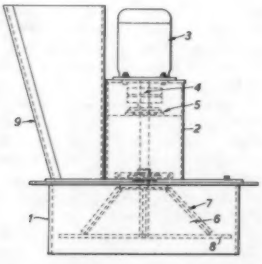
**Ernest A. Pack, Uxbridge, England, assignor to B.H.F. (Engineering) Limited, Middlesex, England**

**Filed Oct. 15, 1980, Ser. No. 197,237**

**Claims priority, application United Kingdom, Oct. 16, 1979, 7935961**

**Int. Cl.³ B02C *19/14***

**U.S. Cl. 241—99** **5 Claims**



**1.** Apparatus for fracturing glassware into cullet comprising: an upwardly and inwardly tapering impact member of noncircular horizontal cross-section mounted for rotation in a given direction about a vertical axis, said impact member including generally vertically extending ribs which have side surfaces facing generally in said given direction; a housing having a side wall with a generally smooth inner surface, said side wall surrounding and horizontally spaced from said impact member and extending downwardly beyond the lower edge of said impact member whereby a generally annular space is formed between said side wall and the lower edge of said impact member; means for rotating said impact member about said vertical axis in said given direction; and glassware feed means including a guide chute having a guide surface inclined downwardly and inwardly toward the side of said impact member for directing glassware issuing from the chute onto the side of said impact member, the arrangement of impact member, housing side wall and chute being such that the glassware is fractured into cullet upon contact with said impact member and falls downwardly away from said impact member and through said generally annular space.

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**4,391,414**

## CONE CRUSHER

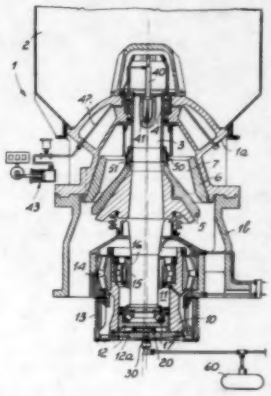
**Rudolf Reiter, Via Fratelli Cervi, 7 - Vimercate (Province of Milan), Italy**

**Filed Jun. 30, 1980, Ser. No. 164,409**

**Claims priority, application Italy, Jul. 10, 1979, 24224 A/79**

**Int. Cl.³ B02C *2/06***

**U.S. Cl. 241—213** **1 Claim**

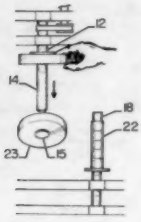


**1.** A cone crusher for crushing stones and the like, comprising an outer shroud enclosing a space, a substantially vertical shaft within said space and driven with a conical swinging motion, said shaft having a downwardly diverging crushing cone at a middle portion thereof, on said shroud a conical ring spacingly arranged around said crushing cone and having a smaller taper than said crushing cone to define an upwardly widening space therebetween, a rotatory bushing member surrounding said shaft below said crushing cone and rotatably supported on said outer shroud, said bushing member having a circular outer periphery defining an axis of rotation and a cylindrical inner cavity having an axis eccentric with respect to said axis of rotation, said cavity receiving a lower end portion of said shaft and having a closed bottom, a piston axially slidable within said inner cavity and arranged below said shaft, bearing means between said shaft and said piston for rotatably supporting said shaft on said piston on one side thereof facing said shaft, said piston having another side thereof opposite to said one side and forming a cylinder chamber with said closed bottom, a hydraulic system for supplying pressure fluid into said cylinder chamber thereby to hydraulically support said piston and said shaft thereon, transmission means on said rotary bushing member for imparting rotation thereto thereby to impart rotation to said bushing member about said axis of rotation thereof and to impart an eccentric rotatory movement to said piston and said shaft thereon, said hydraulic system including a rotary joint connected to said rotary bushing member, said rotary joint having a mounting flange for connection to said closed bottom of said cavity, a fixed channel extending through said mounting flange for the passage of pressure fluid from said hydraulic system into said cylinder chamber of said cavity, a seat in said mounting flange, rotary seals in said seats and interposed between said fixed channel and said mounting flange, a plate member surrounding said fixed channel and providing a clearance therebetween for bleeding off pressure fluid therethrough.

## 4,391,415
## FACILITATING THE EXCHANGE OF A FINISHED PACKAGE WITH A NEW CORE

Joseph H. Hollier, Jr., Pearcy, Ark., assignor to Sutco, Inc., Hot Springs, Ark.

Filed Apr. 23, 1981, Ser. No. 256,847
Int. Cl.³ B65H 19/04
U.S. Cl. 242—56.9 1 Claim




1. In a device for winding a plurality of endless webs of stock material on individual cores on a driven cantilevered support shaft to prepare finished packages of the stock material, the improvement therein for facilitating the exchange of finished packages on the driven cantilevered support shaft with new cores upon completion of a winding operation; the improvement comprising:

(a) a secondary, non-driven cantilevered support shaft located in a first positon in proximity to, but spaced from the driven support shaft, the secondary support shaft having a diameter which is substantially equal to the diameter of the driven support shaft, the secondary support shaft mounted for movement from the first position thereof to a second position thereof wherein the secondary support shaft and the driven support shaft are in a longitudinal, end-to-end alignment, and are contiguous;

(b) means for loading a plurality of unused cores onto the secondary support shaft during the winding operation, while the secondary support shaft is located in the first position thereof;

(c) means for removing the finished packages from the driven support shaft upon conclusion of the winding operation, while the secondary support shaft is located in the first position thereof;

(d) means for moving the secondary support shaft from the first position thereof to the second position thereof;

(e) means for conveying the unused cores from the secondary support shaft onto the driven support shaft and securing the cores on the shaft; and

(f) means for moving the secondary support shaft from the second position thereof to the first position thereof, whereupon a new winding operation is allowed to commence.

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## 4,391,416
## REEL SHAFT DEVICE OF A MAGNETIC RECORDING TAPE RUNNING APPARATUS

Akira Osanai, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 13, 1981, Ser. No. 243,602
Claims priority, application Japan, Mar. 21, 1980, 55-35826; Mar. 21, 1980, 55-36990[U]; Mar. 21, 1980, 55-36991[U]; Mar. 21, 1980, 55-36992[U]
Int. Cl.³ B65H 17/02
U.S. Cl. 242—68.1 17 Claims

1. A reel shaft device of a magnetic recording tape running apparatus comprising:

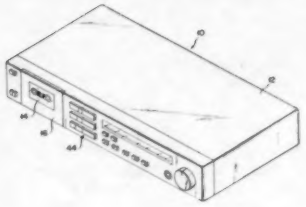
a rotatable reel hub engaging member to be engaged with a reel hub to rotate therewith;

a rotating member capable of rotating with respect to said reel hub engaging member, said rotating member having a circumferential surface;

a rotatable driving member having a circumferential surface facing said circumferential surface of said rotating member and being capable of rotating concentrically with said reel hub engaging member, said driving member being adapted to be selectively rotated in either of two directions by a rotary power supply means;

a plurality of rolling members having axes about which they are rotatable, said rolling member being disposed between said circumferential surface of said rotating member and said facing circumferential surface of said driving member so as to be rotatable about their own axes;

a cam member disposed on one of the respective circumferential surfaces of said rotating member and said driving member, said cam member holding said plurality of rolling members in cooperation with the other of the respective circumferential surfaces of said rotating member and said driving member to rotate said rotating member together with said driving member in one direction when said driving member rotates in said one direction, and releasing




said hold on said plurality of rolling members to allow said rotating member to rotate independently of said driving member when said driving member rotates in the other direction; and

a variable rotation transmitting means for transmitting rotation between said reel hub engaging member and said rotating member such that the rotation transmissibility between said reel hub engaging member and said rotating member increases substantially in inverse proportion to a decrease of the magnitude of a torque applied to said reel hub engaging member;

said rotating member having a sliding surface touching and in sliding contact with said reel hub engaging member along the rotating axis of said reel hub engaging member and along the circumferential direction, respectively; and

said plurality of rolling members being held within the same plane with said sliding surface by the other of said circumferential surface of said rotating member and said circumferential surface of said driving member and said cam member when said driving member rotates in said one direction.

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## 4,391,417
## UNCOILER FOR METALLIC STRIP MATERIAL

Robert W. Gronbech, Sheffield, England, assignor to Davy-Loewy Limited, Sheffield, England

Filed Apr. 10, 1981, Ser. No. 252,866
Claims priority, application United Kingdom, Apr. 10, 1980, 8011895
Int. Cl.³ B21C 47/16; B65H 75/00
U.S. Cl. 242—78.6 6 Claims

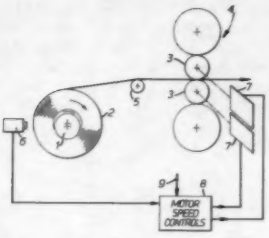
1. An uncoiler for metallic strip material, comprising:

mandrel means;

a coil of strip material, which is characterized by some degree of eccentricity, disposed upon said mandrel means;

means for moving said strip material so as to uncoil said strip material from said mandrel means; and

means interacting with at least one of said eccentrically mounted coil of strip material disposed upon said mandrel means, or said mandrel means, for detecting said degree of eccentricity of said coil of strip material disposed upon said mandrel means, or the rotational effects of said eccentrically




mounted coil of strip material, respectively, as said coil of strip material and said mandrel means are rotated by said moving means, and for controlling the speed of said moving means in response to said degree of eccentricity, or rotational effects, detected.

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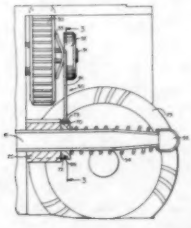
**4,391,418**

## SILENT, ANTI-REVERSE ACTUATOR MECHANISM

**John W. Puryear, Tulsa, Okla., assignor to Brunswick Corporation, Skokie, Ill.**

**Filed Dec. 21, 1981, Ser. No. 333,118**
**Int. Cl.³ A01K *89/01***
**U.S. Cl. 242—84.2 A** **14 Claims**



1. In a spin cast type reel having a longitudinally-movable center shaft (15) operable to control operation of the reel and a control spring (54) surrounding said shaft for yieldably holding the center shaft in one position, a selectively-operable anti-reverse device (40), an actuator (50) associated with said center shaft for rotation about the rotation axis of the center shaft for actuating said anti-reverse device in response to rotation of the center shaft, the improvement comprising: means (70,80,90,65,66) for yieldably holding said actuator in rotatable association with said center shaft with a force which is independent of the force of said control spring (54).

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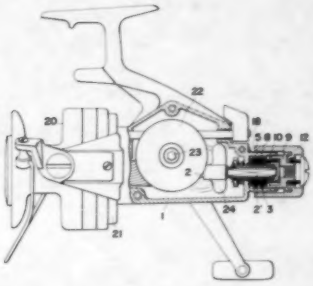
**4,391,419**

## SPINNING REEL BRAKE

**Shinichi Iwama, and Takashi Egasaki, both of Higashikurume, Japan, assignors to Daiwa Seiko Inc., Tokyo, Japan**

**Filed Jul. 9, 1981, Ser. No. 281,641**
**Claims priority, application Japan, Aug. 29, 1980, 55-122524**
**Int. Cl.³ A01K *89/02***
**U.S. Cl. 242—84.5 A** **4 Claims**

1. A drag adjusting device for a spinning reel comprising: a cylinder rearwardly projecting from a housing of a spinning reel and provided at its inner peripheral surface with an axial groove; a spool slide shaft having a spool fixed to the end thereof and projecting into said cylinder through the the bottom end of said cylinder; a braking member comprising a washer fitting said spool slide shaft within said cylinder and rotatable as a unit with said spool slide shaft and a non-rotatable washer fitting said spool slide shaft and engaging said groove of said cylinder; an adjusting sleeve screwed to the outer end opening of said cylinder so as to be able to move back and forth relatively to the latter; a spring acting between the inner bottom surface of said adjusting sleeve and the rear end surface of said braking member and adapted to press said braking member to provide a drag braking force, a handle sleeve coaxially positioned about said adjusting sleeve, said adjusting sleeve and said handle sleeve together defining two cooperating members which are circumferentially adjustable relative to each other to provide a plurality of different ranges of drag braking force, said adjusting sleeve having a range of



movement relative to said cylinder corresponding to each of said plurality of ranges of drag braking force, one of said cooperating members being provided with projection means and the other of said cooperating members being provided with a plurality of circumferentially spaced recess means, whereby to permit said adjusting sleeve to be detached from said handle sleeve when in one circumferential position relative to said handle sleeve and to be re-attached to said handle sleeve when in another circumferential position relative to said handle sleeve, and thus whereby to position said adjusting sleeve relative to said cylinder and to said spring to provide a different desired range of drag braking force in said another circumferential position than in said one circumferential position, and cooperating means carried by said cylinder and by said handle sleeve to limit the rotation of said handle sleeve to not more than one rotation of said handle sleeve in any one of said ranges.

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**4,391,420**

## EMERGENCY LOCKING MEANS FOR DUAL SPOOL SAFETY BELT RETRACTOR

**Munir J. Ahad, Newhall; William Hollowell, Pacific Palisades; Akira Tanaka, Northridge, and Avraham Ziv, Sepulveda, all of Calif., assignors to American Safety Equipment Corporation, San Fernando, Calif.**

**Filed Mar. 9, 1981, Ser. No. 241,531**
**Int. Cl.³ A62B *35/02*; B65H *75/48***
**U.S. Cl. 242—107.4 A** **15 Claims**

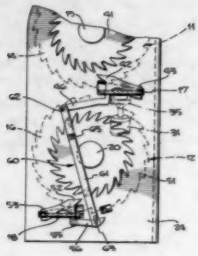
1. An improved dual locking pawl emergency locking means for a dual spool safety belt retractor having first and second belt storage spools, said spools having first and second ratchet means respectively for preventing spool rotation when engaged by the locking means comprising the provision of:

an action pawl means for engaging only said first ratchet means of said first spool;

inertia sensing means for moving said action pawl means into engagement with said first ratchet wheel in response to

changes in vehicle inertia of more than a predetermined amount;

reaction pawl means separate from said action pawl means and so provided as to react in response to movement of said action pawl means to engage said second ratchet wheel of said second spool in response to spool locking action of said action pawl means; and



connecting means interposed between said action pawl means and said reaction pawl means for urging said reaction pawl means into engagement with said second ratchet wheel whereby spool locking movement of said action pawl means urges said reaction pawl means into locking engagement with said second ratchet wheel.

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**4,391,421**

## RETRACTOR FOR SEAT BELT WITH AN ALLEVIATING DEVICE

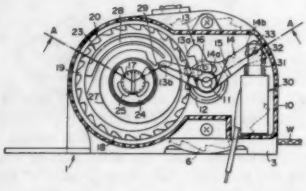
**Katsumi Naitoh, and Hideo Yanagihara, both of Fujisawa, Japan, assignors to NSK-Warner K. K., Tokyo, Japan**

**Filed Mar. 11, 1981, Ser. No. 242,535**

**Claims priority, application Japan, Mar. 21, 1980, 55/35772[U]**

**Int. Cl.³ A62B *35/00*; B65H *75/48***

**U.S. Cl. 242—107.7** **6 Claims**



1. A retractor for a seat belt which is provided with a tension alleviating device, comprising a webbing take-up shaft biased in webbing take-up direction and rotatably supported on a base, a gear train consisting of a first gear member mounted on said take-up shaft for rotation therewith and a second gear member meshing with said first gear member and rotatably provided on said base, the second gear member having a greater number of teeth than the first gear member, a disc with a cam portion provided for rotation with said second gear member by frictional engagement therebetween, and a latch member movable between an engaged position in which it is engaged with a portion integral with said gear train and prevents rotation of said take-up shaft in the webbing take-up direction and a non-engaged position in which it is disengaged from said portion integral with said gear train, said latch member being biased toward said engaged position,

said disc with a cam portion having a generally circumferentially extending first guide portion for guiding said latch member from said engaged position to said disengaged position upon draw-out of webbing, a second guide portion for guiding said latch member to said disengaged position short of said engaged position upon take-up of the webbing with said latch member remaining disengaged from said portion integral with said gear train and for holding said latch member in said disengaged position, said second guide portion being turned back from a terminal end of said first guide portion and extending generally circumferentially beyond a starting end of said first guide portion, and a third guide portion for guiding said latch member held in said second guide portion to said engaged position upon draw-out of the webbing, said third guide portion extending from the terminal end of said second guide portion to the starting end of said first guide portion.

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**4,391,422**

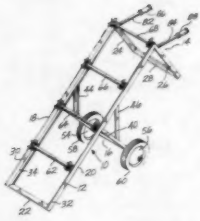
## WEIGHT BALANCED SPOOL CARRIER

**Colin McDonald, 20241 SE. 232 St., Maple Valley, Wash. 98038**

**Filed Apr. 6, 1981, Ser. No. 251,257**

**Int. Cl.³ B65H *49/00, 17/46***

**U.S. Cl. 242—129.6** **14 Claims**



1. A carrier for a plurality of spools of wire or the like, adapted to receive and support the ends of a plurality of spool support shafts which extend laterally across the carrier, through center openings in the spools, and on which the spools rotate, said carrier comprising:

a rectangular main frame having first and second ends and comprising a pair of spaced apart elongated side members, a cross member at said first end connecting the two side members together, said first end presenting a first ground contacting support;

a support stand frame at second end, connecting the two side members together at such end and extending downwardly from the main frame to function as a stand at such second end, and presenting at the its lower end a second ground contacting support;

a wheel supporting frame depending from a midportion of the main frame and including ground contacting wheels at its lower end;

handle means at the second end of the main frame;

journal means carried by the side members of the main frame, for detachably securing the ends of the spool support shafts to said side members;

wherein the journal means for at least one of the spool support shafts is spaced towards the first end of the main frame from the wheels and the journal means for at least one other of the spool support shafts is spaced from the wheels toward the second end of the main frame; and

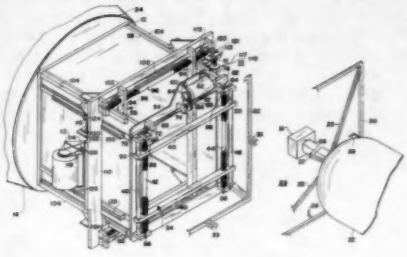
wherein said carrier has a first dispense position wherein the first ground contacting support and the wheels contact the ground and the main frame slopes upwardly from its first end to its second end, and a second dispense position in which the second ground contacting support and the wheels contact the ground and the main frame slopes downwardly from its first end to its second end.

**4,391,423**

## SATELLITE RETRIEVAL SYSTEM

**Edwin C. Pruett; Kem B. Robertson, and Tomas E. Loughead, all of Huntsville, Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Mar. 30, 1981, Ser. No. 248,745**
**Int. Cl.³ B64G 1/64**
**U.S. Cl. 244—161** **5 Claims**



1. A satellite retrieval system for employment with a spacecraft comprising:

a cubical first frame adapted to be fixedly attached to a spacecraft;

a rectangular second frame positioned around said cubical first frame and including support means for movably supporting said second frame on said cubical first frame;

a first pair of parallel bars movably mounted on said cubical first frame for balanced relative movement with respect to a center line through said cubical first frame and normal to a plane of said second frame, being movable across said first frame;

a second pair of parallel bars, orthogonal to said first pair of parallel bars, movably mounted on said second frame for balanced relative movement with respect to said center line, and positioned within said cubical first frame;

first operating means for selectively moving bars of said first pair of parallel bars toward and away from each other;

second operating means for selectively moving bars of said second pair of parallel bars toward and away from each other; and

retracting means including drive means coupled between said cubical first frame and said second frame for selectively moving said second frame along said center line and between extended and retracted positions.

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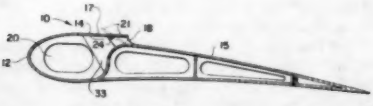
**4,391,424**

## METHOD AND STRUCTURE FOR AIRFOIL THRUST AND LIFT CONTROL

**Otto E. Bartoe, Jr., Boulder, Colo., assignor to Ball Brothers, Boulder, Colo.**

**Filed Aug. 30, 1976, Ser. No. 718,739**
**Int. Cl.³ B64C 21/08**
**U.S. Cl. 244—207** **3 Claims**



2. An aircraft comprising: a power source adapted to produce gases under pressure through a power source exhaust, airfoils, plenum chambers defined spanwise through the airfoils, ducting means to connect the plenum chambers to at least a portion of the exhaust of the power source, an outlet communicating with the plenum chamber defined in the upper leading surface of each airfoil and extending spanwise across the major portion of the airfoil, a gate positioned in each outlet and spanwise pivoted at the middle of the gate for movement to selectively define rearward and forward oriented apertures between the edge of the gate and the outlet, means for moving each gate to define the apertures, and a portion of each said gate is independently pivoted relative to the remainder of the gate and a second means for moving each independent portion of the gate is provided.

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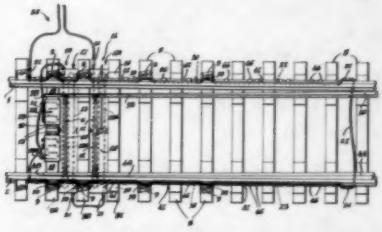
**4,391,425**

## RAILROAD SWITCH HEATER

**Henry Keep, Jr., 88 E. Warf Rd., Madison, Conn. 06443**

**Continuation-in-part of Ser. No. 107,398, Dec. 26, 1979, abandoned, which is a continuation-in-part of Ser. No. 890,637, Mar. 20, 1978, Pat. No. 4,195,805. This application May 28, 1981, Ser. No. 267,791**
**Int. Cl.³ E01B 7/24**
**U.S. Cl. 246—428** **8 Claims**



5. A gauge plate unit for heating a rail positioning gauge plate fastened onto a tie of a railroad switch, said unit comprising a rigid plate member having a substantially flat base wall to overlie a surface of the gauge plate adjacent to a displaceable switch rail end portion and having depending side walls fastenable to opposite sides of said tie under the gauge plate, a layer of heat insulating material fixed beneath said base wall, and a sinuously bent length of an electrical heating cable arranged on and held to said insulating layer so as to be held by said plate member directly against said surface for heat conduction into the gauge plate.

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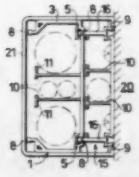
**4,391,426**

## SUPPORT STRIP WITH U-SHAPED CROSS-SECTION OF PLASTIC MATERIAL FOR SUPPORTING CONDUITS, CABLES AND THE LIKE

**Owe Göthberg, Alsätravägen 176, 127 36 Skärholmen, Sweden**

**Filed Jan. 5, 1982, Ser. No. 337,260**
**Claims priority, application Sweden, Jan. 8, 1981, 8100077**
**Int. Cl.³ F16L 3/00**
**U.S. Cl. 248—49** **3 Claims**



1. A support strip of plastic material with substantially U-shaped cross-section for supporting conduits, cables etc. and comprising a substantially plane bottom (2) and side walls (3),

characterized in that the support strip (1,15) in its bottom surface at each of its longitudinal outer portions is provided with a groove (5), which extends along the entire support strip (1,15) and along its entire length is formed with opposed grip edges (6,7), that the free outer edge of each side wall (3,16) along its entire length is formed with a bead (8) constituting in cross-section almost a whole circle area, the diameter of which is slightly smaller than the width of the groove (5) and slightly greater than the distance between the grip edges (6,7), and that the beads (8) of the support strip (1,15) are located at equal distance from the bottom (2) of the support strip and in a plane (x) extending perpendicularly to the bottom (2) and in the central longitudinal line of the groove (5).

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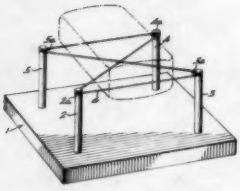
**4,391,427**

## HOLDER FOR A BAR OF SOAP

**Samuel U. Foresman, 672 92nd Ave., North, Naples, Fla. 33940**

**Filed Dec. 4, 1980, Ser. No. 212,819**
**Int. Cl.³ F16M *11/00***
**U.S. Cl. 248—176** **4 Claims**



1. A holder for a bar of soap which permits rapid drying of the entire surface of a wet bar of soap comprising a base,

four supports mounted on said base, each support having a notch at its upper extremity, said four notches forming the four corners of a horizontal rectangle, and a flexible endless cord passing around and supported by said four notches,

said endless cord extending along the bottom and the top of the rectangle between the bottom and the top, said endless cord thereby forming a horizontal soap bar supporting member of small surface area, which enables grasping of the soap from the sides of the rectangle without interference with the cord and which provides substantial support at the center for the soap as it becomes smaller with use.

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**4,391,428**

## LANCE-TYPE FIXTURE SUPPORT AND METHOD OF USE

**Fred K. Grimes, Tallahassee, Fla., assignor to Lance Austin Enterprises, Inc., Tallahassee, Fla.**

**Continuation-in-part of Ser. No. 321,630, Nov. 16, 1981, abandoned. This application Jan. 29, 1982, Ser. No. 344,008**
**Int. Cl.³ F16M *13/00***
**U.S. Cl. 248—546** **17 Claims**

1. A support for mounting a fixture between a pair of spaced structural members comprising:

a pair of elongated lances slidably interconnected for relative longitudinal sliding movement, each of said lances being shorter than the distance between said structural members and together forming an adjustable length support adapted to span the space between said structural members;

member engaging means at the distal end of each of said lances for engaging said structural members and supporting said lances thereon when said lances are independently driven longitudinally in opposite directions against said structural members;

at least one tool-strikable striking element adapted to receive a longitudinally directed blow from a striking tool; and

striking element coupling means on each of said lances for coupling said striking element to each lance at a fixed location intermediate the ends thereof to enable said lances to be independently driven in opposite directions when said striking element is coupled to each of said lances independently of the other and is struck with said tool, whereby said member engaging means are independently driven into engagement with said structural members.

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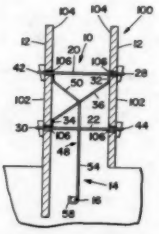
**4,391,429**

## FORM TIE

**John M. Powell, P.O. Box 3200, San Jose, Calif. 95156**

**Filed Sep. 4, 1981, Ser. No. 299,799**
**Int. Cl.³ E04G *17/08***
**U.S. Cl. 249—84** **3 Claims**




1. A form tie for use in fixing a pair of form sides in a preselected spaced position with respect to each other at a given location against shear and transverse forces acting on said form sides at said given location and for locating, supporting and maintaining at least one reinforcing rod at a preselected location intermediate said form sides, said form tie comprising:

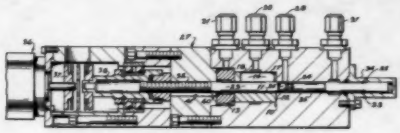
a unitary elongate member of a generally Z-shaped configuration including a pair of generally parallel elongate members having first and second end portions, the first end portion of each parallel, elongate member being positioned in an opposed, spaced apart relationship with respect to the second end portion of the other parallel elongate member and having a bight formed therein terminating in a rectilinear brace extending substantially normal to said parallel, elongate members, and

means for locating, supporting and maintaining at least one reinforcing rod at said preselected location intermediate said form sides comprising a second unitary elongate member formed integrally with said rectilinear tab of said bight of one of said second end portions and lying substantially in the plane of said generally planar structure, said second unitary elongate member having a first portion extending obliquely from said rectilinear tab to said preselected location and terminating in an L-shaped member adapted to receive said at least one reinforcing rod and maintain said rod at said preselected location.

## 4,391,430
## HYDRAULIC SERVO CONTROL SPOOL VALVE

Donald M. Miller, Sunnyside, Wash., assignor to Battelle Memorial Institute, Richland, Wash.

Filed May 15, 1981, Ser. No. 264,146
Int. Cl.³ F16K 47/04, 3/32
U.S. Cl. 251—205 10 Claims



1. A valve for extremely precise variable control of high pressure, low volume fluid flow of hydraulic liquids, comprising:

a solid sleeve having an inner surface surrounding an open cavity;

a long narrow slot extending through the sleeve from an entrance defined by a pair of elongated straight sharp corner edges formed at the intersection between the sleeve inner surface and the slot;

said corner edges of the slot being progressively spaced apart from one another along its length in a linear fashion from a first closed slot end at which they intersect one another to a second open slot end;

said slot being formed by a pair of elongated opposed walls extending through the sleeve and diverging radially outwardly from its inner surface;

a spool within the open cavity of the sleeve, said spool having an outer surface complementary in size and shape to the inner surface of the sleeve;

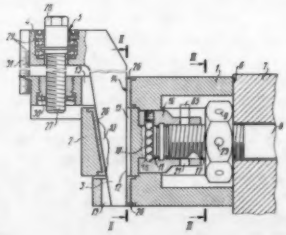
a fluid path on the spool, the fluid path extending from an inlet along the spool to an end wall forming a sharp corner edge at its intersection with the spool outer surface, said end wall being transversely positioned across the entrance of said slot;

and means slidably mounting said spool and sleeve relative to one another for adjustably locating the position of said end wall along the entrance of said slot.

## 4,391,431
## DEVICE FOR TIGHTENING COARSE THREAD CONNECTIONS

July S. Maximov, ulitsa Lesnaya, 52, kv. 8, Moskovskaya oblast, poselok Pravda, U.S.S.R.

PCT No. PCT/SU79/00102, § 371 Date Feb. 23, 1981, § 102(e) Date Feb. 23, 1981, PCT Pub. No. WO81/00075, PCT Pub. Date Jan. 22, 1981
PCT Filed Oct. 29, 1979, Ser. No. 243,901
Claims priority, application U.S.S.R., Jun. 27, 1979, 2785072
Int. Cl.³ E21B 19/00
U.S. Cl. 254—29 A 16 Claims

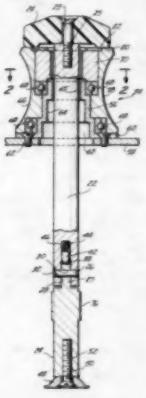


1. A device for tightening a connection member extending between and interconnecting two connectable pieces, said connection member having a threaded member protruding from an opening in one of the connectable pieces, said device comprising a pressure element positionable so as to thrust against said one of the connectable pieces, a tension element positionable on the threaded member and having a wedge groove, a power wedge accommodated in the wedge groove and acting against the pressure element thereby producing tension in the threaded member, a screw drive for the power wedge disposed on the presure element, the pressure element being in the form of a hollow body provided with through grooves arranged coaxially with the wedge groove and accommodating the tension element, the tension element carrying an axially rotatable connecting piece having an axial threaded bore for fixing the connecting piece on the threaded member, the pressure element being provided in an area adjoining the connecting piece with apertures, walls of the through grooves arranged coaxially with the wedge groove of the tension element defining a guide receiving a straight working surface of the power wedge.

## 4,391,432
## WINCH OPERATING HANDLE

Jean F. Baud, 1295, Tannay Vaud, Switzerland

Filed May 1, 1981, Ser. No. 259,521
Int. Cl.³ B66D 1/14
U.S. Cl. 254—365 8 Claims



1. An improved winch of the type which is useful in tightening and adjusting ropes, rigging, lines and sheets comprising; a winch mounting post having a hollow interior and a through aperture from end to end, means for mounting said post to a fixed support, a winch member having a through passageway and being rotatably mounted on the post with the post extending into the passageway of the winch member, a portion of the winch member extending beyond the post and having the surfaces thereof forming part of the passageway with a non-circular cross-section, the outer surface of the winch member overlying the non-circular cross-section portion and the post extending within the passageway, the outer surface of the winch forming the operable bearing surface for adjusting of the ropes, riggings, lines and sheets, a crank member having a shaft portion which has a non-circular cross-section complementary with the shape of the non-circular portion of the passageway and interengageable therewith so that meshing of the shaft with the surfaces forming the non-circular portion of the passageway and rotation of the shaft causes rotation of the winch member, a handle member hinged to the upper end of the shaft portion so as to pivot between an operating position at right angles with the shaft portion to facilitate rotation of the shaft portion and winch member and an inoperative stowable

position projecting from the end of the shaft portion in alignment with the axis thereof, said handle portion having a size and configuration so as to fit through the passageway in the winch member so that when it is in an inoperative stowed position the crank member including the handle portion extends downwardly through the passageway in the winch member, the through aperture in the post, and a communicating opening in the support to its stowed position with only a minimum projection thereabove.

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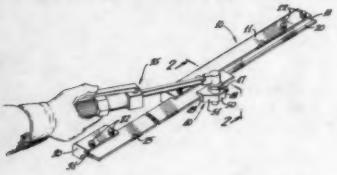
**4,391,433**
**EXTENDABLE TORCH GUIDE**
**Robert L. Doan, 10362 Vic Pl., Garden Grove, Calif. 92642**
**Filed Jun. 10, 1982, Ser. No. 386,954**
**Int. Cl.³ B23K 7/10**
**U.S. Cl. 266—77** **17 Claims**



1. A guide for a torch for use in cutting metal plate comprising:

a base member, said base member having a longtudinal channel therein and magnetic means on one side thereof for removably attaching said base member to a metal plate;

an elongate cutting rail at least partially mounted within said channel in said base member for slidable movement relative thereto, the ends of said cutting rail being extendable beyond the ends of said base member;

means for locking said cutting rail relative to said base member to prevent relative movement therebetween; and

an end support member connectable to said ends of said cutting rail, said end support member having magnetic means on one side thereof for removable attachment thereof to said metal plate.

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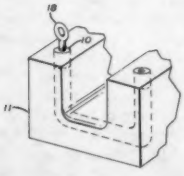
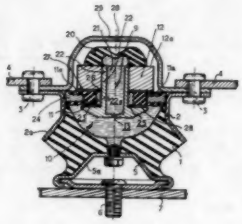
**4,391,434**
**CERAMIC INSERT**
**Micheal D. LaBate, 115 Hazen Ave., Ellwood City, Pa. 16117**
**Continuation-in-part of Ser. No. 123,369, Feb. 21, 1980, Pat. No. 4,262,885. This application Apr. 6, 1981, Ser. No. 251,319**
**The portion of the term of this patent subsequent to Apr. 21, 1998, has been disclaimed.**
**Int. Cl.³ C21B 7/14**
**U.S. Cl. 266—196** **5 Claims**



1. The combination of a preformed hot metal runner formed of refractory material and at least one U-shaped ceramic insert embedded therein with the ends of the U-shaped insert flush with the upper surfaces of said hot metal runner, a threaded socket formed in each end of said U-shaped ceramic insert arranged to receive a threaded fastener therein.

**4,391,435**
**SUSPENSION DEVICE**
**Anh T. Pham, Elancourt, France, assignor to Chrysler France, France**
**Continuation-in-part of Ser. No. 53,305, Jun. 29, 1979, abandoned. This application Feb. 19, 1981, Ser. No. 236,295**
**Claims priority, application France, Jul. 3, 1978, 78 19797; May 23, 1979, 79 13128**
**Int. Cl.³ F16F 1/54, 13/00**
**U.S. Cl. 267—140.1** **2 Claims**

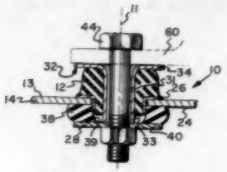


1. In a device for mounting a carried element on a carrying element in an automotive vehicle or the like and comprising a first frame member affixed to said carried element, a second frame member affixed to said carrying element, at least one resiliently deformable support arranged between said members so as to define a fluid-tight chamber with said frame members, said chamber containing an incompressible fluid and being divided into two portions by a separating partition formed of a resilient portion affixed to said first frame member and carrying a block member immersed in said fluid which is provided with at least one orifice through which the fluid is adapted to pass from one chamber portion of the other chamber portion, the improvements comprising: said block member carried by said resilient portion has a certain substantial inertial mass such that said block member constitutes means for causing said resilient portion to oscillate substantially following the displacement of said carried element when said carried element vibrates at a frequency less than a particular frequency resulting in a first normal fluid flow pattern through said orifice between said chamber portions relative to the displacement of said carried element, and for causing said resilient portion to oscillate differently from the displacement of said carried element when said carried element vibrates at a frequency greater than said particular frequency resulting in a second fluid flow pattern through said orifice between said chamber portions relative to the displacement of said carried element which is substantially inverted relative to said first normal fluid flow pattern, and wherein a deformable cover is directly secured on said block member for movement therewith to sealingly close the fluid tight chamber and isolate the fluid from the surrounding medium, and wherein said block member forms a part of a block assembly which includes a tubular member which is affixed to said resilient partition so as to extend centrally therethrough so that end regions thereof project beyond the surface of said resilient portion, one end region of said tubular member having said orifice provided therein, said block member being affixed to an upper end region of said tubular member, whereby said block member is supported by said resilient portion through said tubular member.

## 4,391,436
## RESILIENT MOUNTING

Byron L. Fishbaugh, St. Marys, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jul. 23, 1981, Ser. No. 286,399
Int. Cl.³ F16F 3/08
U.S. Cl. 267—141.1 8 Claims



1. A resilient mounting comprising:
(a) a spacer including an elongated cylindrical portion;
(b) an annular first insulator of elastomeric material including an upper and lower portion and having a central bore extending axially through said upper and lower portions, the upper portion including a generally cylindrical inner wall and a generally planar lower end wall, the lower portion including generally cylindrical outer and inner walls, the overall diameter of the upper portion being greater than that of the lower portion, the diameter of the bore in the upper portion being greater than the diameter of the bore in the lower portion;
(c) a metallic annulus including a tubular portion joined at one end to the inner annular edge of a perpendicularly extending flat disc having a central bore therethrough, the flat disc of said metallic annulus being bonded to the lower end wall of the upper portion of the first insulator, the tubular portion of the metallic annulus being bonded to the outer cylindrical wall of the lower portion;
(d) a second insulator of elastomeric material of a generally cylindrical configuration having a central bore extending axially therethrough, said bore diameter corresponding approximately to the outside diameter of the tubular portion of the metallic annulus;
(e) a flat disc having a central bore therethrough coaxially aligned with and bonded to one axial end face of said second rubber insulator;
(f) the cylindrical portion of said spacer having an outside diameter greater than the bore diameter of the lower portion of the first insulator, said cylindrical portion adapted to be forcibly fitted into the bore of said first insulator thereby radially compressing the lower portion of said first insulator between the cylindrical portion of said spacer and the tubular portion of said metallic annulus at least 10 percent;
(g) said first and second insulators adapted to be drawn axially toward one another thereby placing the elastomeric material of said first and second insulators in axial compression during installation of the mount, the amount of axial compression being limited to a predetermined amount by the respective overall axial dimensions of the spacer and undeformed insulators.

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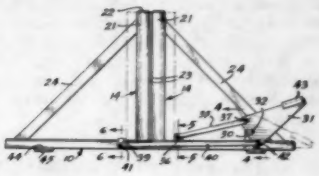
## 4,391,437
## DOOR HOLDING CLAMP

William T. Collins, Rte. 4, Box 340, Lillington, N.C. 27546

Filed Oct. 24, 1980, Ser. No. 200,231
Int. Cl.³ B25B 1/00
U.S. Cl. 269—254 CS 6 Claims

1. Apparatus for clamping a workpiece in a position so that work may be performed thereon comprising an elongated hollow base having a pair of opposed flanges at the top, said flanges extending inwardly toward each other and defining an opening, a pair of clamp members slidably mounted on said base, each of said clamp members including a body having portions underlying said flanges, each of said clamp members having a post fixed to said body and extending upwardly between said flanges of said base, spring means connecting said clamp members and urging said posts toward abutting relationship, an upstanding support plate means mounted on said base adjacent to one end, lever means rotatably mounted on said support plate means, a first link connecting one of said clamp



members to one side of said lever means, a second link connecting the other clamp member to the other side of said lever means, and means for rotating said lever means, whereby movement of said lever means in one direction causes said first and second link means to move said clamp members in opposite directions against the tension of said spring means and when said movement of said lever means is relieved said spring means moves said clamp members toward each other.

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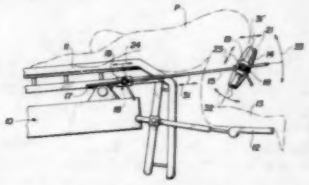
## 4,391,438
## PATIENT SUPPORT ATTACHMENT FOR SURGICAL TABLES

Charles A. Heffington, Jr., 123 E. College St., Murfreesboro, Tenn. 37130

Filed Jun. 12, 1981, Ser. No. 273,210
Int. Cl.³ A61G 13/00
U.S. Cl. 269—328 5 Claims



1. A patient support attachment for an operating table to facilitate surgery of the spine, the operating table having an end support portion for the arms, head and shoulders of a patient in a prone position and having an adjustable generally level support platform for the legs of a prone patient in a kneeling position with the support platform and legs spaced from the adjacent end of the operating table at an elevation below the level of said end support portion of the table, and the end support portion of the operating table carrying a pair of opposite side adjustable swivel clamps, said attachment comprising a pair of spaced substantially parallel longitudinally extending elongated support rods adjustably held in said opposite side swivel clamps of the table and extending for a substantial distance beyond the end support portion of the table in cantilevered relationship to the table, said support rods being longitudinally adjustable forwardly and rearwardly in said side swivel clamps of the table and being swingable upwardly and downwardly vertically around the transverse axes of the side swivel clamps and being lockable by such clamps in selected adjusted positions, a support panel for the buttocks and thighs of a patient disposed between said support rods in spaced relationship to said end support portion of the table and above the level of said support platform for the legs, and another pair

of opposite side adjustable swivel clamps carried by said support panel for the buttocks and thighs and being adjustably engaged with and bodily supported by said support rods and also being adjustably engaged with said support panel, whereby the support panel for the buttocks and thighs may be moved forwardly or rearwardly along the longitudinal axes of the support rods, may be rotated in either direction around the transverse axes of the last-named pair of swivel clamps and may be shifted in opposite directions on a linear path across the rotational axis of said support panel as defined by the last-named swivel clamps and locked securely in a selected adjusted position on the support rods by the last-named swivel clamps, the body of a patient utilizing the attachment being substantially unsupported between the end support portion of the table and the support panel for the buttocks and thighs.

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**4,391,439**

## METHOD AND APPARATUS FOR CALIBRATION AND ADJUSTMENT OF INSERTER FOR SHEETED MATERIAL

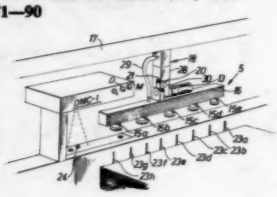
**Lars G. Edström, Stockholm, Sweden, assignor to Malmohus Invest AB, Malmo, Sweden**

**Division of Ser. No. 9,953, Feb. 6, 1979, Pat. No. 4,349,189. This application Oct. 31, 1980, Ser. No. 202,862**

**Claims priority, application Sweden, Feb. 7, 1978, 7801396; Feb. 7, 1978, 7801397; Feb. 7, 1978, 7801398; Feb. 7, 1978, 7801399; Jun. 15, 1978, 7806910**

**Int. Cl.³ B65H *7/14, 7/12***

**U.S. Cl. 271—90** **7 Claims**



1. Method for calibration and adjustment of an inserter working with air suction for picking up a sheeted or folded material one at a time from a bundle for insertion in a machine, comprising:

sensing how many sheets of said material have been picked up by means of a sensor which transmits different output signals which correspond respectively to no sheet of the material picked up, one sheet of material picked up or several sheets of material picked up;

controlling the suction of the inserter such that the suction is increased a specific amount if the output signal issued by the sensor corresponds to no sheet of material picked up, or the suction is descreased a specific amount if the output signal issued by the sensor corresponds to more than one sheet of material picked up; and

adjusting the suction in the inserter after each pick up of the material until the output signal issued by the sensor corresponds to one sheet of material in the machine.

2. Apparatus for calibration and adjustment of an inserter working with air suction for picking up a sheeted or folded material one at a time from a bundle for insertion in a machine, comprising:

an inserter (5) including means for producing air suction to pick up a sheeted or folded material one at a time from a bundle for insertion of the picked up sheeted or folded material into a machine;

a sensor (24) positioned adjacent said inserter (5) and arranged for transmitting different output signals which correspond respectively to no sheet of material picked up, one sheet of material picked up or several sheets of material picked up;

said means for producing air suction in said inserter (5) including an individually driven variable air suction source (19); and

means coupled to said sensor (24) for controlling said variable air suction source (19) responsive to the output signal from said sensor (24) such that said air suction source produces increased suction if said sensor output signal corresponds to no sheet of material picked up or decreased suction if said sensor output signal corresponds to more than one sheet of material picked up.

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**4,391,440**

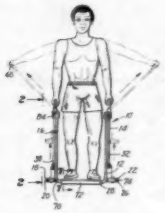
## PORTABLE EXERCISING APPARATUS

**Isaac Berger, c/o Ike Berger Enter., 263 W. 38th St., New York, N.Y. 10018**

**Filed Feb. 9, 1981, Ser. No. 232,955**

**Int. Cl.³ A63B *21/06***

**U.S. Cl. 272—118** **12 Claims**



1. A portable, body-anchored exercising apparatus, comprising:

(a) an erect vertically elongated rigid frame;

(b) a pair of separate elongated, flexible ropes mounted on and being axially movable along their axes of elongation in relation to the frame at opposite sides thereof, said ropes being capable of being pulled by a user for exercise purposes, and said ropes generating a substantially upward force on the frame when so pulled, each rope of said pair of ropes having a grasp end which when idle is situated at approximately mid-body level of an adult user;

(c) separate means for resisting the pulling forces on the ropes generated by the user;

(a) a pair of separate pulley systems, each pulley system being operatively interposed between a different resistance means and an associated rope, each pulley system including at least two vertically spaced pulleys about which the associated rope is trained, the upper pulley being rotatably supported by the rigid frame and the lower pulley being rotatably supported by the associated rope, the lower pulley supporting the associated resistance means, whereby the apparatus is provided with a mechanical advantage greater than 1 to 1 in favor of the grasp ends, the mechanical advantage allowing the user to move the grasp ends through a distance greater than the distance through which the associated resistance means moves; and

(e) a base connected to the frame and on which the user rests his body weight while exercising on the same, said base exerting a force opposing the force of the pulled ropes, when the user's weight is applied to said base, said base being operative for permitting the user to hold the apparatus down using his own body weight in any desired position while exercising.

**4,391,441**

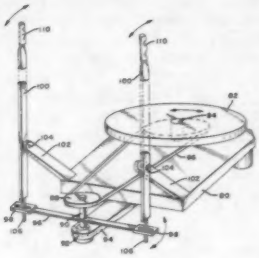
## EXERCISE APPARATUS

**Luther G. Simjian, 1750 S. Ocean La., Fort Lauderdale, Fla. 33316**

**Division of Ser. No. 196,849, Oct. 14, 1980, Pat. No. 4,313,603. This application Oct. 23, 1981, Ser. No. 314,173**

**Int. Cl.³ A63B** *23/02*

**U.S. Cl. 272—126** **5 Claims**



1. An exercise apparatus comprising:

a stationary support;

a platform mounted upon said support for oscillating rotating motion about a centrally disposed axis and adapted to support a person in standing position;

a pair of upstanding posts mounted forward of the perimeter of said platform and pivotally supported for enabling the upper end of each post to undergo oscillating motion in a direction generally toward and away from said platform, and

means coupling said platform to said posts for causing the upper ends of said posts to move in opposition relative to each other toward and away from said platform responsive to oscillating motion imparted to said platform.

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**4,391,442**

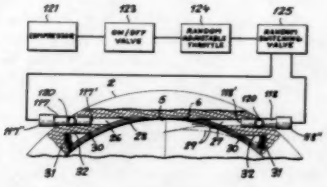
## GAMING APPARATUS

**David Levy, 360 W. 55th St., New York, N.Y. 10019**

**Division of Ser. No. 132,085, Mar. 20, 1980, Pat. No. 4,337,945. This application Feb. 2, 1982, Ser. No. 345,024**

**Int. Cl.³ A63E** *5/04*

**U.S. Cl. 273—142 E** **3 Claims**



1. A gaming apparatus comprising:

a roulette wheel having a circular rim, a downwardly converging frustoconical bowl contained within said rim and joined thereto below the upper surface of said rim to form therewith a track for a roulette ball, a rotatable wheel head centered within said bowl at the bottom thereof and formed with a plurality of numbered compartments for receiving said roulette ball;

an automatic roulette ball spinner having a pair of guide tubes directed oppositely to one another and positioned along said rim for directing said ball tangentially onto said track, said guide tubes having a roulette ball magazine communicating therewith and means including respective powered plungers provided in said guide tubes for propelling said ball through said guide tubes;

selector means for randomly activating either of said powered plungers; and

means for randomly adjusting the propelling force of said powered plungers, each of said guide tubes communicating with said track by way of a respective bore formed in said rim and blocked by a pivotable arcuate flap biased into a closed position and displaceable into an open position by said ball propelled through said bore.

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**4,391,443**

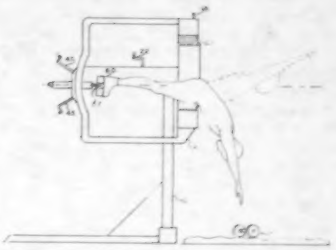
## EXERCISE APPARATUS

**Julian B. Beecroft, Box 57, Port Hope, Ontario, Canada (L1A 3V9)**

**Filed Jun. 25, 1981, Ser. No. 277,123**

**Int. Cl.³ A63B** *23/02*

**U.S. Cl. 272—145** **21 Claims**



3. An exercise apparatus for use by a human being, which comprises:

a ring shaped cushion member, having an axis, dimensioned and configured to support one side of a human torso in generally axially aligned relationship with said cushion member and in shaped relationship to any other side of the associated human torso;

means for supporting said cushion member in a generally horizontal position for free rotational movement about the axis thereof, said cushion member being adapted to be moved rotationally only in response to forces imposed by the user; and

means for receiving and securing the feet of a user disposed in axially spaced relationship from said ring shaped cushion member.

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**4,391,444**

## ELECTRONIC GAME PROVIDING FORMATION CHANGES AND METHOD

**Eric Bromley, West Simsbury, Conn., assignor to Coleco Industries, Inc., Hartford, Conn.**

**Filed Feb. 9, 1981, Ser. No. 232,808**

**Int. Cl.³ A63F** *9/00*

**U.S. Cl. 273—94** **32 Claims**

27. In a method of simulating a sports-action team game, the steps of:

a. providing a housing;

b. providing a display panel on the upper surface of said housing that provides a visual simulation of a playing field of the type on which a ball-type game is played and is adapted to display symbols in and between side and end boundary positions on said field in response to electrical signals applied thereto;

c. providing operational-circuit means in said housing operatively connected to said display panel for generation and transmission of electrical signals to said display panel to produce offensive and defensive play symbols on said simulated playing field, one of said offensive play symbols

at a time simulating the position of the ball, said operational-circuit means step including:

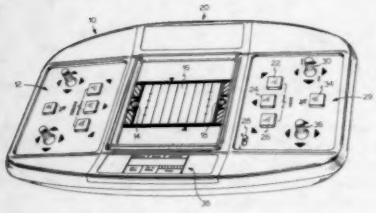
(i) moving a multiplicity of said offensive play symbols, including said ball-position symbol, along said playing field, said multiplicity of offensive play symbols including a concurrently movable plurality thereof;

(ii) moving a multiplicity of said defensive play symbols along said playing field toward said ball-position symbol, movement of said offensive and defensive play symbols providing play action simulating the action of said sports-action team game;

(iii) detecting the coincidence of said ball-position symbol with at least a selected one of said defensive play symbols during at least a portion of a play and terminating play action upon such detection; and

(iv) monitoring play action to record information concerning the status of said simulated game and for producing signals indicative of said status information, said signals conveying the recorded information to an operator of said game;

d. providing a control board on said housing that includes a multiplicity of manually operable control elements connecting said control board to said operational-circuit means for transmission of signals thereto through operation of said control elements, effecting movement of said ball-position symbol by said offensive-play-symbol-movement means in response to operation of said control elements by an operator to effect movement of said ball-position symbol through said defensive play symbols to simulate advance of the ball, terminating play action by said



detecting means upon the occurrence of said game terminating coincidence;

e. monitoring the position of at least one of said concurrently movable plurality of offensive play symbols and assigning prohibited moves thereto based on its monitored position on said playing field;

f. operating at least one of said manually operable control elements to transmit signals to said operational-circuit means to direct the same move to each of said concurrently movable plurality of offensive play symbols, including a prohibited move to at least one of said concurrently movable plurality;

g. effecting all of the directed moves of said concurrently movable plurality except said at least one prohibited move, thereby changing the formation defined by the relative positions of said concurrently movable plurality;

h. operating at least one of said manually operable control elements to transmit signals to said operational-circuit means to direct a move of said concurrently movable plurality of offensive play symbols that is not prohibited to any of them; and

i. effecting said last-mentioned directed moves of all of said concurrently movable plurality, thereby maintaining the new formation resulting from said first-mentioned effected moves.

**30.** In an electronic apparatus for simulating a sports-action team game, the combination comprising:

a. a housing;

b. a display panel on the upper surface of said housing providing a visual simulation of a playing field of the type on which a game between opposing teams is played, said display panel having a multiplicity of discrete visual-image-producing devices arranged along x- and y-axes of said simulated playing field and adapted to display symbols representing players of opposing teams at a multiplicity of discrete positions along said x- and y-axes on said playing field in response to electrical signals transmitted thereto;

c. operational-circuit means in said housing operatively connected to said display panel for generation and transmission of electrical signals thereto to produce symbols of said opposing teams on said simulated playing field, at least one of said teams including at least first and second symbols;

(i) means for moving a multiplicity of said symbols of said one team along said playing field, said multiplicity of symbols including said first and second symbols;

(ii) means for moving a multiplicity of the symbols of the other team along said playing field toward one of said symbols of said first team, movement of said symbols of said two teams providing play action simulating the action of said sports-action team game; and

(iii) means for monitoring the position of at least one of said symbols of said first team, means assigning prohibited moves thereto based on its monitored position on said playing field, and means for preventing said prohibited moves of said at least one symbol by said first team symbol movement means;

d. a control board on said housing including a multiplicity of manually operable control elements, said control board being electrically connected to said operational-circuit means for transmission of signals to said operational-circuit means through operation of said control elements, said control elements including first and second elongated levers, respectively, associated with said first and second symbols, said levers being pivotally mounted in said control board for pivoting from rest positions in which the longitudinal axes of said levers extend generally perpendicularly to the upper surface of said housing, said pivoting being along two pivotal axes extending generally perpendicularly to the longitudinal axes of said levers, said control board further including at least three switches associated with each of said levers along said pivotal axes thereof and electrically connected to said operational-circuit means for transmission of electrical signals thereto to direct movements of said symbol associated with each of said levers, pivoting of each of said levers along one pivotal axis in first and second directions operating the associated first and second switches to direct motion of the associated symbol in first and second directions, respectively, along one axis of said simulated playing field, pivoting of each of said levers in a first direction along the second pivotal axis thereof operating the associated third switch to direct motion of the associated symbol in a first direction along the other of said axes of said playing field, each actuation of a switch causing only one step of motion of the associated symbol, each lever and its associated switches being cooperatively configured and dimensioned and each lever being pivotally mounted to permit operation of only one switch at a time by each lever.

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**4,391,445**

## LOGICAL SKILL TOY

**Gábor Vizelyi, Pákozdi tér 3., Budapest 1148, Hungary**

**Filed Feb. 18, 1981, Ser. No. 235,528**

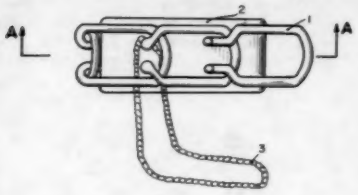
**Claims priority, application Hungary, Apr. 3, 1980, 802/80**

**Int. Cl.**[3] **A63F** *9/08*

**U.S. Cl. 273—158** **4 Claims**

**1.** A logical toy comprising a series of hooks with legs fixed about the perimeter of a disc, the legs of each of said hooks being fixed and connected to said disc so that the annular

closed part of each hook except the first in the series encloses the legs of the preceding hook adjacent to it to thereby form a trap with said hook; and a closed cord arranged around the legs of one of said hooks.

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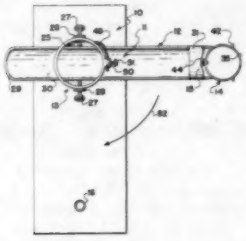
**4,391,446**

## GOLF BALL DISPENSER

John Eberle, 2027 - 28th Ave. SW., Calgary, Alberta, Canada (T2T 1K4)

Filed Aug. 7, 1980, Ser. No. 176,116
Claims priority, application Canada, Sep. 25, 1979, 336457
Int. Cl.³ A63B *57/00*
U.S. Cl. 273—201 28 Claims



1. A golf ball dispenser for use with a fixed tee comprising in combination a base, a feed tube component mounted upon said base for pivotal movement in a horizontal plane from a ball dispensing position adjacent the tee, to a position clear of the tee and vice versa, said feed tube component sloping downwardly towards the outboard end thereof to feed golf balls by gravity towards said outboard end, a dispensing head pivotally secured to said outboard end and being movable from a ball detent position to a ball dispensing position and vice versa, means normally urging said head to said ball detent position, said outboard end of said feed tube component being apertured in the base thereof to provide a ball dispensing aperture, said dispensing head being pivotally supported for fore and aft tipping movement, within said feed tube component adjacent said ball dispensing aperture, said head including a front wall and rear wall, said rear wall acting as a ball detent when in said ball detent position and preventing a ball from passing from said feed tube component to said aperture, said detent releasing the front ball in said feed tube component to a position in said aperture, when said head is moved to said ball dispensing position, said front wall holding said ball in said ball dispensing position, said detent engaging between said front ball and the ball immediately therebehind and thereby releasing said front ball through said aperture, when said head is moved back to the ball detent position, means to activate said head including means spanning said aperture and engaging the associated tee when said dispenser is moved to the dispensing position, said last mentioned means including a tee striking portion pivoted for movement to said front wall of the feed tube and extending into said aperture, and a dispensing head engaging portion connected to said tee striking portion, for moving said dispensing head to the ball dispensing position when said tee striking portion engages said tee.

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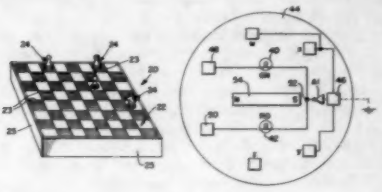
**4,391,447**

## ELECTRONIC CHESS GAME

Raymond Dudley, 833 S. Cedros, Apt. 24, Solana Beach, Calif. 92075

Filed Nov. 20, 1980, Ser. No. 208,781
Int. Cl.³ G09B *19/22*
U.S. Cl. 273—238 25 Claims



1. An electronic game comprising a playing board defining a plurality of playing positions, a plurality of playing pieces, at least some of which are of different types, each piece being movable between playing positions in accordance with a predetermined pattern dependent upon its type, said predetermined pattern being influenced by the locations of other ones of said pieces, means for encoding each piece according to its type, means at each position responsive to the encoding means for detecting the presence and type of a piece located at that position, and means responsive to the detecting means for illuminating each position on the board to which such piece can be moved, the illuminating means being responsive to the locations of other ones of said pieces.

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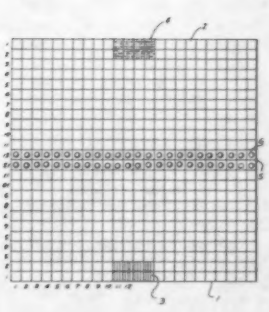
**4,391,448**

## METHOD OF PLAYING A TWO-PLAYER BOARD GAME

Conrad Hermann, 3rd, 1551 East Walnut La., Philadelphia, Pa. 19138

Division of Ser. No. 967,223, Dec. 17, 1978, abandoned. This application Jan. 19, 1981, Ser. No. 226,431
Int. Cl.³ A63F *3/00*
U.S. Cl. 273—243 4 Claims



1. A method of playing a game for two players which comprises the steps of

(A) providing three sets of playing pieces including means for distinguishing each of these sets from the other two and providing an equal number of pieces in each set;

(B) providing between the players a rectangular board marked off into a plurality of equal-sized squares, wherein ($B_1$) the two rows of squares half-way between the players, identifiable as the MID-ZONE have placed

thereon, before commencement of play, all the pieces of one of the three sets, identifiable as the initial or BOARD set of pieces, one BOARD piece being on each square of said MID-ZONE, the said equal number of pieces in each set thus being equal to the number of squares in the MID-ZONE, and

($B_2$) in the middle of each player's end of said board there is a relatively small rectangle of squares, including several squares in the first line of said player's side, marked off as a respective HOME BASE accessible only to said repective player, the remaining squares on the entire board being accessible at all times to any playing piece of either player, once said piece has been placed on the board by means hereinafter set forth;

(C) providing chance means manipulatable by said players for placing and moving said pieces on said board, said chance means comprising a device for indicating at random a number selected from zero, 1, 2, 3, 4, and 5;

(D) each of said players being provided with one of the remaining sets of playing pieces, identifiable as his OWN playing pieces in contrast to the BOARD pieces which are never possessible by either player;

(E) selecting one of said two players as the one to commence play, this play being identifiable as the FIRST PLAYER;

(F) manipulating said chance means to determine the number of spaces which the FIRST PLAYER may move any of the BOARD pieces toward his own HOME Base;

(G) manipulating said chance means to determine the number of spaces which the SECOND PLAYER may move any of the BOARD pieces to his own HOME BASE;

(H) manipulating said chance means to determine the successive alternate moves of the players who may use the indicium number to (i) move the same or other BOARD pieces, removing from the Board any BOARD piece which reaches his HOME BASE and replacing it with one of his OWN pieces, or (ii) move one of his thus-placed OWN pieces from his HOME BASE on to the open board, or (iii) move either a BOARD piece or one of his OWN pieces in such a manner as to have said two pieces occupy an identical otherwise unoccupied square, replacing the BOARD piece by another of his off-the-board OWN pieces (leaving two identical pieces temporarily on the same square) and removing the BOARD piece from the board, or (iv) move one of the player's OWN pieces to the same space already occupied by an opponent's OWN piece or pieces, removing said opponent's piece or pieces from the board and placing anywhere in the MID-ZONE a BOARD piece (From off the board) for each opponent's thus removed OWN piece,—all of such possible moves being such that the total number of pieces on the board remains constant;

(I) and repeating the alternating steps set forth in (H) until one of the players has the complete set of his OWN pieces on the board.

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**4,391,449**

## BOARD GAME

**Robert L. Johnson, 3655 Pruneridge, Apt. 261, Santa Clara, Calif. 95051**

**Filed Jun. 8, 1981, Ser. No. 271,626**
**Int. Cl.³ A63F *3/02***
**U.S. Cl. 273—260** **11 Claims**

1. A board game comprising:

a playing surface provided with indicia including:

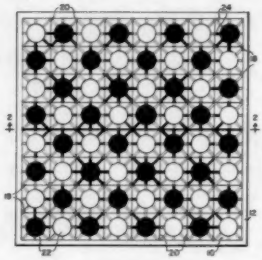
(A) a first plurality of spaced apart parallel lines;

(B) a second plurality of spaced apart parallel lines substantially perpendicular to said first plurality of lines, whereby said playing surface is divided into a number of four-sided spaces;

(C) a plurality of positioning marks located, one each, within each of said spaces;

(D) a plurality of directive lines located, eight each, within each of said spaces such that, within each space, four of said directive lines extend from said positioning mark to the corners of said space, and the other four of said directive lines extend from said positioning mark to the four sides of said space;

(E) directive line distinguishing means wherein a first group of said plurality of directive lines have a first visual appearance, and a second group of said plurality of directive lines have a second visual appearance;



(F) a plurality of first player pieces, each of which has a first side having a first distinguishing characteristic, and a second side having a second distinguishing characteristic; and

(G) a plurality of second player pieces, each of which has a first side having a first distinguishing characteristic, and a second side having a second distinguishing characteristic.

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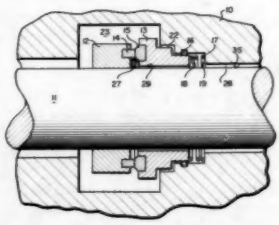
**4,391,450**

## SHAFT SEAL RESISTANT TO ELECTROKINETIC CORROSION

**Theodore R. Beck, Seattle, Wash., assignor to Electrochemical Technology Corp., Seattle, Wash.**

**Filed Aug. 30, 1982, Ser. No. 412,709**
**Int. Cl.³ F16J *15/16, 15/34***
**U.S. Cl. 277—1** **15 Claims**



1. In combination with a shaft, a housing, and means mounting said shaft for rotation within said housing, a shaft seal for preventing the leakage of liquid between said shaft and said housing, said shaft seal comprising:

a stationary first annular seal element associated with said shaft housing;

said shaft extending through said first annular seal element;

a second annular seal element;

means mounting said second seal element on said shaft for rotation therewith;

each of said seal elements having a respective mating surface;

means for urging said mating surfaces together to provide rubbing engagement between said mating surfaces during said rotation;

one of said two seal elements being composed of a material having a relatively high hardness;

the other of said two seal elements being composed of a material having a relatively low hardness which allows the

harder of the two seal elements to conform the softer seal element to the harder one;

both of said seal elements being composed of a material which will not support an electrochemical reaction;

said mounting means for said seal elements and said respective compositions of the seal elements comprising means for conforming the mating surface of said other seal element to the mating surface of said one seal element, on a macro scale, when said mating surfaces undergo said rubbing engagement, during said rotation;

and means, including the respective composition of each seal element, for substantially eliminating electrokinetic corrosion at said mating surface thereof when the shaft seal is used to prevent leakage of an electrolytic liquid.

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**4,391,451**

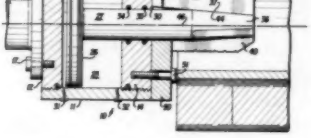
**EXPANSIBLE CHUCK ASSEMBLY**

**Arthur D. Secor, and Jerome G. Secor, both of Toledo, Ohio, assignors to Great Lakes Industries, Inc., Toledo, Ohio**

**Filed Sep. 17, 1980, Ser. No. 188,109**

**Int. Cl.³ B23B *31/40, 5/34, 31/10***

**U.S. Cl. 279—2 A** **14 Claims**



1. A rotatable expansible chuck assembly for use in web winding and unwinding operations which comprises a body, a hermetically sealed chamber in said body, a piston in said chamber dividing said chamber into two hermetically sealed spaces, fluid pressure check and bleed valves mounted on said body connected to said chamber through said body on opposite sides of said piston into respective said spaces, a piston rod connected to said piston extending therefrom through an aperture in said body, a plurality of inclined plane wedge surfaces provided on said piston rod where it extends out of said aperture, a plurality of gripping means, each said gripping means having an inner surface engaging a corresponding said wedge surface and an outer surface to receive a core for a roll of web material to be wound or unwound, and a slidable connection between each said gripping means and said body whereby each said gripping means is movable generally radially relative to said body in response to movement of said piston rod, resilient means retaining said gripping means in said body which is so arranged and constructed that said gripping means are readily removable from said body and replaceable by other gripping means, said valves, said chamber, said piston and said piston rod being so constructed and arranged that when the outer surface of said gripping means is engaging a core of material being wound or unwound under a predetermined tension the fluid under pressure in said space on the side of said piston urging said gripping means into engagement with said core is isolated from any other fluid pressure sources, the fluid in the other said space is in communication via its bleed valve with the atmosphere and said engagement due to the net pressure against said piston is continually sufficient to maintain said tension irrespective of minor distortions due to movement or stretching of said core.

**4,391,452**

**CONTROL CIRCUIT FOR VEHICLE LEVELING SYSTEM**

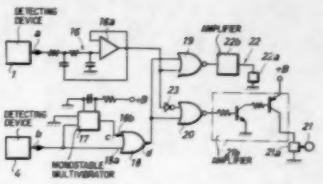
**Taiji Ohmori, Kawagoe, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 16, 1981, Ser. No. 225,777**

**Claims priority, application Japan, Jan. 17, 1980, 55-3965**

**Int. Cl.³ B60G *11/26***

**U.S. Cl. 280—6.1** **8 Claims**




1. A control circuit for a vehicle leveling system to restore a vehicle height to be within a reference vehicle height range by operating either a first drive means to raise a vehicle body or a second drive means to lower the vehicle body when said vehicle height is out of said reference vehicle height range, comprising:

a first detecting means for generating a directional signal of vehicle height change in the form of either a HIGH signal or a LOW signal;

a second detecting means for generating a command signal of vehicle height adjustment in the form of either an OFF signal or an ON signal;

main circuit means for selecting for operation either said first drive means to raise said vehicle height or said second drive means to lower said vehicle height in response to said directional signal, and for determining whether or not said drive means is to be actuated;

holding circuit means, connected between said second detecting means and said main circuit means, for increasing the duration of said OFF signal for a predetermined length of time when said OFF signal appears instantaneously, and for transmitting said OFF signal with said duration to said main circuit means; and

said holding circuit means comprising a monostable multivibrator connected so as to receive said command signal from said second detecting means, and an OR gate connected so as to receive said command signal from said second detecting means and an output from said monostable multivibrator.

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**4,391,453**

**CHILD STROLLER**

**Dieter Gläser, Dachau, Fed. Rep. of Germany, assignor to PEG Perego-Pines Deutschland GmbH, Dachau, Fed. Rep. of Germany**

**Filed Oct. 1, 1980, Ser. No. 192,920**

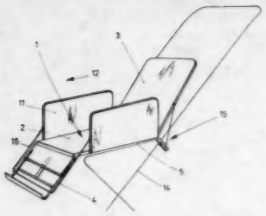
**Claims priority, application Fed. Rep. of Germany, Oct. 4, 1979, 2940302; Apr. 16, 1980, 3014674**

**Int. Cl.³ B62B *9/10***

**U.S. Cl. 280—47.4** **25 Claims**

1. A child stroller having a frame (5), a seat (1) formed by at least one seating surface member (2, 2¹), a back rest (3), a footrest (4), supporting means (17, 18, 19) for disposing said one seating surface member on said frame relative to said back rest to support a child in a seated position, adjustment means (9) for moving said one seating surface member longitudinally relative to said back rest to provide a usable portion of said seat

of variable length corresponding to the length of the child's thigh, and locking means (8, 10) for holding said one seating



surface member in its adjusted position relative to said back rest.

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**4,391,454**

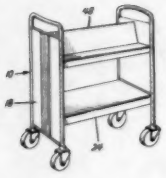
**UTILITY CART WITH DETACHABLE AND REVERSIBLE SHELVES**

**Douglas D. Marsh, 1212 Mark Dr.; Arthur E. Feldman, 108 Iwo St., and John C. Newlin, R.R. #3, all of Auburn, Ind. 46706**

**Filed Apr. 4, 1980, Ser. No. 137,388**

**Int. Cl.³ B62B *11/00***

**U.S. Cl. 280—47.35** **4 Claims**



1. A utility cart having reversible shelves comprising a pair of end frames, each having a pair of elongated rigidly connected upright hollow supports which are parallel and spaced apart, each end frame having an end panel secured to said upright supports, an orthogonal shelf device detachably secured at the corners to said upright supports: said shelf device including two parallel flanges on opposite side edges and being essentially open at the opposite ends thereof, one mounting bracket secured to each end of each flange and having an attaching portion projecting angularly inwardly, each attaching portion engaging the respective upright support at a point within the angle defined by the shelf corners; each support having at said engagement point a threaded opening through one side thereof, and one fastener received by an opening in each attaching portion and being threaded into said threaded opening for securing said shelf device to said upright supports, said flanges extending between said pair of end frames and said panels being juxtaposed with the opposite ends of said shelf device thereby serving as end closures therefor, said shelf device also having a bottom formed with two portions angling downwardly from said two flanges, respectively, and an upstanding inverted V-shaped wall portion connected at the lower edges to the inner facing edges of said two bottom portions, respectively, said wall portion including two back panels and being provided at each end of one back panel thereof with an elongated plate like bracket which generally lies in a plane at right angles to said one back panel, each said bracket extending into the apex portion of said wall portion and having an opening for receiving a fastener, and a fastener extending through an opening in each end panel and into each said bracket opening for supporting said wall portion with respect to said end frame.

**4,391,455**

**TRACTOR VEHICLE PROVIDED WITH A FIFTH-WHEEL PLATE**

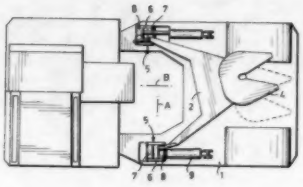
**Nils Fagerstedt, Espoo, Finland, assignor to Oy Sisu-Auto Ab, Helsinki, Finland**

**Filed Nov. 25, 1980, Ser. No. 210,444**

**Claims priority, application Finland, Dec. 14, 1979, 793931**

**Int. Cl.³ B62D *53/08***

**U.S. Cl. 280—407** **9 Claims**



1. A tractor vehicle provided with a fifth-wheel plate, comprising a chassis, a beam mounted on said chassis vertically pivotably on two fulcrums spaced-apart in the transverse direction of said vehicle, and a fifth-wheel plate supported by said beam, in which the improvement comprises said fulcrums of said beam being independently displaceable in the longitudinal direction of said vehicle.

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**4,391,456**

**SKI STICK GRIP**

**Beat Moor, Meiringen Halteli CH3860, Switzerland**

**PCT No. PCT/CH80/00058, § 371 Date Feb. 7, 1981, § 102(e) Date Jan. 22, 1981, PCT Pub. No. WO80/02649, PCT Pub. Date Dec. 11, 1980**

**PCT Filed May 13, 1980, Ser. No. 233,605**

**Claims priority, application Switzerland, Jun. 7, 1979, 5292/79**

**Int. Cl.³ A63C *11/22***

**U.S. Cl. 280—821** **4 Claims**

1. A ski stick grip attached to a ski stick having a center portion, two side portions of substantially equal length extending from the said center portion at right angles to the longitudinal axis of the ski stick, an upper surface and a lower surface in which the force of the hand is applied substantially in the direction of the longitudinal axis of said ski stick, permitting the movement of the wrist joint substantially parallel to the movement of the hand and at right angles of the forearm to increase the force applied by the arm and the wrist to said stick;

said ski stick grip enabling the placing of the palm of the hand on said upper surface;

said lower surface arranged for accommodating the thumb of the hand, allowing the hand to surround said grip by forming substantially a fist;

said upper surface being extended outwardly and upwardly;

said lower surface of said ski stick grip curved downwardly; and

a pommel formed, extending upwardly substantially from the center portion of said grip;

allowing the force on the ski stick grip to be exerted substantially parallel to the longitudinal axis of the ski stick.

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**4,391,457**

## COMBINATION POCKET PAD AND WRITING INSTRUMENT HOLDER

**Paul B. Gassner, 0405 SW. Texas St., Portland, Oreg. 97219**

**Filed Aug. 3, 1981, Ser. No. 289,470**
**Int. Cl.³ B42D** *3/06, 3/12*
**U.S. Cl. 281—31** **6 Claims**

1. A book-type combination pocket pad and writing instrument holder comprising:

a cover foldable into front and back cover sections along a hinge portion,

retention means along an inside face of one said cover section for retaining a pad of paper sheets,

slip inhibiting means on the outside face of said one cover section for frictional contact with the material of an open pocket for resisting gravity-induced sliding movement of said cover from said pocket yet allowing easy manual removal of said cover from said open pocket, said slip inhibiting means comprising a high friction surface,

spacer means projecting from an inside face of the other said cover section toward the inside face of the one said cover section when said sections are folded together to space the cover sections one from the other, said spacer means comprising a pair of laterally spaced apart relatively rigid parallel ribs integral with said other cover section and spaced inwardly of opposite side edge portions of said other cover section in positions overlying said pad when said cover sections are folded together,

said ribs being positioned laterally on opposite sides of a center portion of said other cover section so as to define with the inside faces of said cover sections a rigid pocket therebetween when said cover sections are folded together for receiving writing instruments clipped to said other cover section and extending along the inside face thereof.

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**4,391,458**

## PIPE COUPLING WITH GASKET LOCATING MEANS

**James Blakeley, Thornhill, Canada, assignor to Blakeley Engineering Limited, Thornhill, Canada**

**Filed Apr. 10, 1981, Ser. No. 252,921**
**Int. Cl.³ F16L** *21/06, 41/00*
**U.S. Cl. 285—112** **5 Claims**

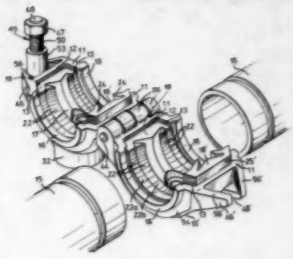
1. A pipe coupling device comprising

two arcuate housing segments, each having opposable ends and a continuous inner wall surface, said housing segments being movable from an open position to a closed position in which said opposable ends are brought into opposition, said housing segments thereby defining a generally cylindrical coupling housing which is adapted to engage the pipes to be coupled;

arcuate gasket means of generally C-shaped cross-section within the coupling housing, said gasket means having radially enlarged free ends defining substantially planar surfaces adapted to abut along an axially extending sealing line;

a recess defined in the closed position of said housing segments by adjacent radially outwardly extending depressions in the end region of the inner wall surfaces of the two opposing housing segments;

radially outwardly projecting lugs on said gasket means adjacent to and co-extensive with the enlarged free ends, wherein the lugs interact with the recess to position the gasket means within the coupling housing in the closed position of the housing segments so that the radially outer side of said sealing line is spaced circumferentially from the opposed ends of said housing segments and is in contact with the inner wall surface of one of said segments;



a sealing lip formed at axially opposite ends of the interior of the gasket means, said sealing lip comprising a radially inwardly extending portion terminating at at least one enlarged free end of the gasket means in a projection extending circumferentially from and beyond the generally planar surface of said enlarged free end, whereby circumferential retraction of said sealing lip is compensated for to maintain a complete circumferential surface to seal under internal pressure; and

releasable locking means cooperating with the housing segments for locking the segments together in the closed position.

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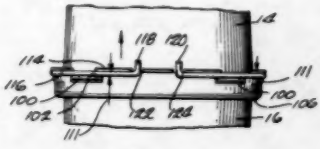
**4,391,459**

## INSTANT HOT WATER DISPENSER

**Charles A. Wicke, and Wayne C. Riley, both of Racine, Wis., assignors to Emerson Electric Company, St. Louis, Mo.**

**Filed Feb. 9, 1981, Ser. No. 233,221**
**Int. Cl.³ F16L** *47/00*
**U.S. Cl. 285—238** **6 Claims**



1. In a hot water dispenser having an upper tank with a lower end and a lower tank with an upper end, the improvement wherein:

a. the lower end of the upper tank is formed with a plurality of outturned flanges and an external circumferential groove for receiving an O-ring;

b. the upper end of the lower tank is formed with a shoulder for receiving and supporting the lower end of the upper tank and for forming a seal with the O-ring, a plurality of gaps for receiving the outturned flanges of the upper tank, and a plurality of outturned flanges between the gaps, one of the outturned flanges having at least one small notch therein; and

c. a retaining ring inserted between the outturned flanges of

the upper and lower tanks, the retaining ring having at least one upturned locking portion that protrudes into the small notch in the notched flange of the lower tank,

so that the notched flange will deform under internal pressure in the dispenser to release the retaining ring and release the pressure.

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4,391,460

## ADJUSTABLE MULTIPLE BOLT LOCKING SYSTEM

Jose D. Bonet, Martin el Humano, 12-6° Valencia, Spain

Filed May 27, 1980, Ser. No. 153,691
Claims priority, application Spain, May 25, 1980, 480.950
Int. Cl.³ E05C 1/06
U.S. Cl. 292—37 4 Claims

1. A security lock system comprising a plurality of bolts operated by a common key and a corresponding multiple strike for accommodating said bolts; a main carrier including a single box section forming a lock covering the entire vertical dimension of the door; said main carrier having at at least one of the ends thereof means for adjustment in length to the vertical dimension of the door; means for common operation of the plurality of bolts; said bolts including bolts in at least one cross bar, said cross bar being adjustably locatable at any height on said door; said cross bar and said multiple strike having adjustment means therein for adjusting the lengths thereof.

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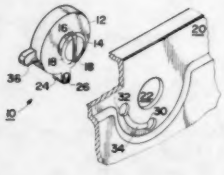
4,391,461

## QUARTER-TURN FASTENER

Florian C. Deibele, Tigard, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 16, 1980, Ser. No. 197,438
Int. Cl.³ E05C 3/12
U.S. Cl. 292—204 5 Claims




1. A fastener for releasably latching a panel to a cabinet, comprising:

a generally disc-like one-piece body;

means integrally formed with said body for rotatably mounting said body to said panel;

a lip integrally formed with said body and extending radially therefrom, said lip being rotatable into latching engagement with said cabinet; and

a positioning boss integrally formed with said body, said positioning boss comprising a projection engagable with a detent in said panel for establishing a stable position of said fastener.

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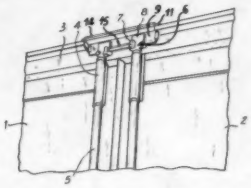
4,391,462

## ANTI-THEFT LOCKING DEVICE ADAPTABLE TO CONTAINERS

Guy Loreal, Teteghem, France, assignor to Societe Navale Chargeurs Delmas-Vieljeux, France

Filed Jul. 31, 1981, Ser. No. 288,831
Claims priority, application France, Aug. 8, 1980, 80 17553
Int. Cl.³ E05C 3/04
U.S. Cl. 292—207 4 Claims




1. In a container presenting hingedly mounted doors maintained in tight-sealing closure position by at least one rotating vertical rod provided at its ends with locking members engaging fixed stops of the door frame, an anti-theft locking device which comprises:

a rain-strap opening provided in a front extension of the container roof in the vicinity of the upper end of said rotating vertical rod,

a lug-shaped upper extension of the rotating vertical rod being placed in front of an upper portion of the door frame and providing, in the closure position of the rotating vertical rod, a free space in relation with said door frame, and

a vertically movable plate engaging said rain-strap opening and moving downwards by gravity to lodge into the free space between said upper extension of the rotating vertical rod and said supper portion of the door frame,

whereby the rotating vertical rod can be released to open the doors only when said movable plate has been raised sufficiently, this upward movement of the movable plate being normally prevented in any container supporting another, stacked container, by this other container.

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4,391,463

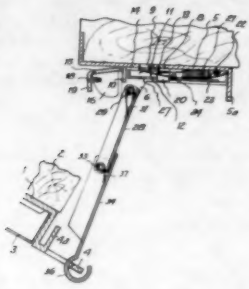
## DOOR CATCH

Enrique Costa Bastart, Calle Mayor de Gracia, 213, Barcelona 13, Spain

Filed Jun. 3, 1981, Ser. No. 269,948
Claims priority, application Spain, Jun. 16, 1980, 251422[U]
Int. Cl.³ E05C 17/32
U.S. Cl. 292—263 8 Claims

1. A catch for holding a door closed, comprising two complementary mutually engageable latching means, and respective mounting means for mounting said latching means to respective ones of a door and an element adjacent the door so that the latching means are mutually engageable when the door is closed; a first one of said mounting means comprising an extendible link and means for articulating said link to the door or element, whereby in use the door is partially inwardly openable to a predetermined extent with the latching means mutually engaged; the link being displaceable between releasable and locked configurations in which the latching means respectively are and are not mutually disengageable by opening the door; said first mounting means also including an actuating element which is displaceable between actuating and non-actuating configurations, in the former of which it is actuable to displace the link to its releasable configuration, said

actuating element being constructed and arranged to be displaceable in use to its actuating configuration from outside the



partially open door, and to be actuated by closure of the door, whereby the door is freely inwardly openable with disengagement of the latching means.

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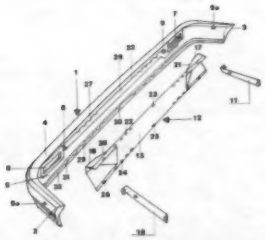
**4,391,464**

## BUMPER FOR MOTOR-VEHICLES AND THE LIKE, MADE OF PLASTIC MATERIALS, AND HAVING ITS CROSS SECTION CLOSED BY A REAR REINFORCING PART

**Maurizio Masotti, Saronno; Antonio Zentile, Paderno Dugnano, and Pasqualino Cau, Oggiono, all of Italy, assignors to Montedison S.p.A., Milan, Italy**

**Filed Mar. 4, 1981, Ser. No. 240,299**
**Claims priority, application Italy, Mar. 6, 1980, 20385 A/80**
**Int. Cl.³ B60R *19/00***
**U.S. Cl. 293—120** **6 Claims**



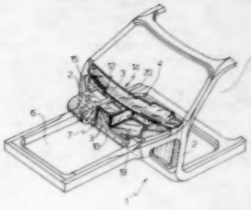
1. A bumper for a motor-vehicle having a box-shaped cross-section, comprising an elongated bumper member made of plastics material and having an open cross-section substantially shaped like a "C", said bumper member being closed in the rear by one removable reinforcing wall comprising a substantially rectilinear lamina having at each end one enlargement radiused to the plane of the lamina by means of a slanting plane and provided with transversal holes for a stable anchoring of the reinforcing wall to the bumper member and to the motor-vehicle, said reinforcing wall having along its longitudinal borders first coupling means which are engageable with corresponding second coupling means provided along the opposite longitudinal borders of the bumper member, said first and second coupling means providing a solid joining of the bumper member and reinforcing wall.

**4,391,465**

## ASSEMBLY SEPARATING A PASSENGER COMPARTMENT FROM AN ENGINE COMPARTMENT

**Renzo Piano, Paris, France, assignor to Fiat Auto S.p.A., Turin, Italy**

**Filed May 13, 1981, Ser. No. 263,136**
**Claims priority, application Italy, May 20, 1980, 67794 A/80**
**Int. Cl.³ B62D *25/08***
**U.S. Cl. 296—208** **8 Claims**



8. An assembly of elements having the function of separating the passenger compartment from the engine compartment of a motor vehicle, characterized in comprising:

a first panel-shaped element made of a first plastic material, having a width and a height which are substantially equal to the width of the bodywork and to the distance between the floor and windshield of the passenger compartment, respectively, the said first element being provided with fastening means for connecting the said assembly to the said bodywork,

a second element made of a second plastic material having mechanical characteristics different from those of the said first element, the said second element having a width substantially equal to that of the said bodywork, being provided with housings for the indicator and control instruments of the motor vehicle and being arranged to be fixed to the said first element in a stage prior to the stage of fastening of the complete assembly on the said bodywork; and

a third element, having U-shaped cross-sections and arranged to be fixed to the said first element and to form together with this latter a closed channel communicating with at least one of the said chambers or channels formed by the union of the said first element with the said second element.

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**4,391,466**

## WATER CHAIR

**Peter A. Smith, 102 Evelyn St., Sylvania 2224, N.S.W., Australia**

**Filed Feb. 6, 1981, Ser. No. 231,970**
**Int. Cl.³ A47C *7/02, 7/36***
**U.S. Cl. 297—452** **7 Claims**

1. A chair for one or more persons, comprising a frame, a seating portion and a back supporting portion being defined by

the frame, the chair back comprising a plurality of cushions arranged to be partially filled with water, a corresponding plurality of slings, each sling being attached along an upper margin of the back supporting portion; each cushion comprising a water impermeable bag carried within a sling, the bag being partially filled with water, the plurality of cushions being mounted one above the other to the back supporting portion of the frame, with the lowermost part of one cushion resting on the uppermost part of the cushion below it, whereby in use of the chair said cushion supports and adapts itself to the shape of the back of said one or more persons.

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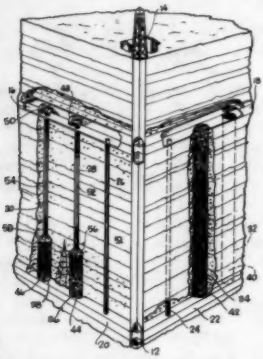
**4,391,467**

## SYSTEM FOR PRODUCING A UNIFORM RUBBLE BED FOR IN SITU PROCESSES

**Terry R. Galloway, Berkeley, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Apr. 10, 1981, Ser. No. 253,125**
**Int. Cl.³ E21C *41/10***
**U.S. Cl. 299—2** **14 Claims**



1. A method of producing in an underground formation a cavity filled with a bed of uniform rubblized material, comprising:

forming a substantially vertical pilot hole in the underground formation;

reaming the pilot hole into a cavity, thereby forming fines and rubblized material; and

drawing a flushing fluid out of the cavity to carry away the fines, leaving a bed of rubblized material in the cavity.

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**4,391,468**

## METHOD AND APPARATUS FOR RECOVERING MINERAL NODULES FROM THE OCEAN FLOOR

**Erwin D. Funk, Glen Falls, N.Y., assignor to Kamyr, Inc., Glen Falls, N.Y.**

**Continuation-in-part of Ser. No. 894,433, Apr. 7, 1978, abandoned. This application Sep. 5, 1979, Ser. No. 72,778**
**Int. Cl.³ E02F *5/00***
**U.S. Cl. 299—8** **19 Claims**

1. A method of recovering mineral nodules of a size range up to 8" nominal diameter deposited on the ocean floor which comprises the steps of

pumping a continuous flow of ocean water along a first confined path extending through an exchange position within the vicinity of the ocean floor where the mineral nodules to be recovered are deposited from an ocean water inlet position out of said ocean vicinity and then upwardly to a discharge position on a surface vessel,

confining ocean water within a second path within the aforesaid ocean vicinity,

continuously flowing ocean water in said second path by pumping the same at a pumping position spaced downstream from an exchange position therein,

continuously moving from the ocean floor to a separating position within said ocean vicinity a mixture containing deposited mineral nodules of up to 8" nominal diameter and smaller particles forming a part of the ocean floor on which the mineral nodules were deposited,

continuously separating at said separating position said mixture so as to obtain a supply of separated mineral nodules up to 8" nominal diameter within ocean water separate from the remainder of said mixture which contains said smaller particles,

returning said smaller particles in the remainder of said mixture to the ocean at a position within said ocean vicinity,

continuously feeding the supply of separated mineral nodules to said second path at a feeding position upstream from the exchange position therein, and

continuously exchanging between the exchange positions within said first and second paths successive incremental volumes of ocean water and mineral nodules from said second path to said first path with comparable successive incremental volumes of ocean water from said first path to said second path whereby the mineral nodules within said second path are removed therefrom upstream of the pumping position in said second path and moved into said first path downstream from the pumping position in said first path for movement in said first path to said discharge position.

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**4,391,469**

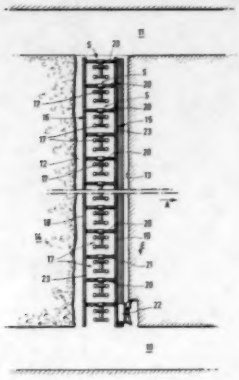
## MINERAL MINING INSTALLATION

**Yavier Arsuaga, Madrid, Spain, assignor to Gewerkschaft Eisenhutte Westfalia, Lunen, Fed. Rep. of Germany**

**Filed Oct. 19, 1981, Ser. No. 313,010**
**Claims priority, application Fed. Rep. of Germany, Oct. 31, 1980, 3041101**
**Int. Cl.³ E21C *29/02*; E21D *23/04***
**U.S. Cl. 299—11** **31 Claims**

1. A mineral mining installation for use in a steeply-inclined longwall working, the installation comprising a ladder-shaped support frame and a plurality of roof support units, the support frame extending along the longwall working and having a pair of generally parallel longitudinal beams interconnected by a plurality of transverse beams, the roof support units being positioned between the longitudinal beams and being supported on the transverse beams, each of the longitudinal beams comprising a plurality of beam sections pivotably connected

together end-to-end, wherein the support frame comprises a plurality of detachably connected sub-frames, each of which



comprises a respective transverse beam and a respective beam section of each of the longitudinal beams.

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**4,391,470**

## METHOD OF, AND APPARATUS FOR, WINNING MINERAL MATERIAL

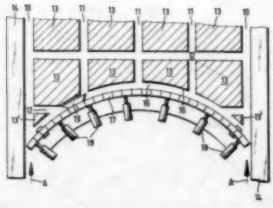
**Helmut Langenberg, Lunen; Hans-Theodor Grisebach, Unna, and Heinz Weinhold, Gelsenkirchen, all of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lunen, Fed. Rep. of Germany**

**Filed Mar. 9, 1981, Ser. No. 241,483**

**Claims priority, application Fed. Rep. of Germany, Mar. 14, 1980, 3009923**

**Int. Cl.³ E21C *27/24, 35/16***

**U.S. Cl. 299—11** **22 Claims**



**1.** A method of winning mineral material from pillars left between laterally spaced roadways or galleries by the bord-and-pillar mining process, the method comprising the steps of forming an arcuate longwall face which extends between the roadways across a plurality of pillars, and of winning mineral material in a non-uniform manner from said pillars using mechanical winning means.

**4,391,471**

## GUIDES FOR MINERAL MINING MACHINES

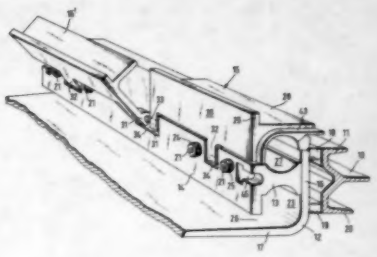
**Alois Hauschopp, Werne; Hans-Dieter Schneider, and Christoph Rassmann, both of Lunen, all of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lunen, Fed. Rep. of Germany**

**Filed Mar. 31, 1981, Ser. No. 249,315**

**Claims priority, application Fed. Rep. of Germany, Apr. 2, 1980, 3012884**

**Int. Cl.³ E21C *35/08***

**U.S. Cl. 299—43** **31 Claims**



**3.** A guide for mineral mining; said guide comprising means defining upper and lower chain passages for receiving a chain used to drive a plough, the defining means including spacers separating the upper and lower passages, angle plates with surfaces which form a lower support for the plough and covers which close off the upper passage and which are pivotable outwardly from the upper passage to permit across thereto, wherein the covers have flat upper surfaces which serve to contact and support a machine and a guide rail for the plough or machine is formed by projections on the covers delimiting the upper surfaces.

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**4,391,472**

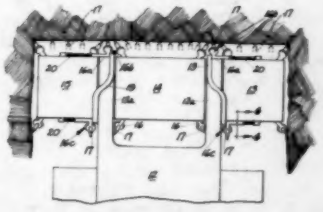
## CORE ELIMINATOR FOR MINING, ROAD WORKING OR EARTH MOVING MACHINERY

**Claude B. Krekeler, Cincinnati, Ohio, assignor to The Cincinnati Mine Machinery Company, Cincinnati, Ohio**

**Filed Oct. 17, 1980, Ser. No. 197,892**

**Int. Cl.³ E21C *27/24, 35/18***

**U.S. Cl. 299—86** **21 Claims**



**1.** A core eliminator for mining, road working or earth moving machinery comprising at least a pair of rotatable, driven drums having a plurality of cutter bits disposed thereon, said drums being rotatably mounted on a boom strut located between said drums and between the kerfs formed by said drums and cutter bits as the machinery operates on the material being worked by it; at least one bit holder attached to one of said drums and having a bit therein normally within the confines of the kerf formed by that drum, said bit holder being movable on that drum to an extended position so as to bring said bit therein beyond the kerf formed by that drum and

towards the kerf formed by the other drum whereby to destroy the core which would otherwise form between said kerfs; and additional means to move said bit holder and bit therein to said extended position between said kerfs and to retract said bit holder and bit therein from said extended position, said additional means comprising a cam.

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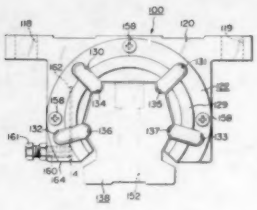
**4,391,473**

## LINEAR BEARING UNIT

**Hiroshi Teramachi, 34-8, Higashi-Tamagawa 2-chome, Setagaya-ku, Tokyo, Japan (158)**

**Filed Oct. 13, 1981, Ser. No. 310,662**
**Int. Cl.³ F16C *29/06***
**U.S. Cl. 308—6 C** **8 Claims**



1. A linear bearing unit essentially comprising a bearing case having a lower open end and four non-loading ball holes having the substantially same inner diameter as the ball diameter, side covers firmly secured to both end faces of said bearing case, a track table inserted through a cylindrical inner recess of the bearing case and a number of balls arranged in line one after another through four longitudinally extending circular hollow space between semi-circular concave track grooves on the cylindrical inner recess of the bearing case and another corresponding concave track grooves on the track table as well as through the four non-loading ball holes in the bearing case, said longitudinally extending circular hollow spaces being in communication with the non-loading ball holes via U-shaped concave portions formed on both the side covers, wherein the bearing case has annular projections at both the end faces thereof which are located between the non-loading ball holes and the concave track grooves on the cylindrical inner recess and further it has a longitudinally extending deep slit at one side thereof so as to prestress or preload some of the concave track grooves on the cylindrical inner recess, while the side covers contain annular grooves corresponding to said annular projection, U-shaped concave portions and ball guide tongue portions in communication with the longitudinally extending circular hollow space at the innermost end of said U-shaped concave portions.

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**4,391,474**

## THRUST SHAFT SEAL WITH SLIDABLY MOUNTED BEARING SLEEVE

**Leonard J. Martini, 2801 Ocean Front Walk, F, San Diego, Calif. 92109**

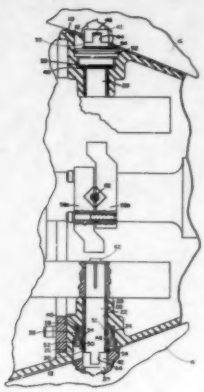
**Filed Feb. 26, 1981, Ser. No. 238,334**
**Int. Cl.³ F16J *15/26, 15/56*; F16C *33/74***
**U.S. Cl. 384—152** **8 Claims**

1. A seal for a thrust shaft in a body wherein the body has a bore and a counterbore, comprising:

a bearing sleeve slidably mounted on the shaft, said bearing sleeve having a static O-ring which seals the interior of the sleeve to the shaft and a flange which extends into the counterbore;

means radially fixing the bearing sleeve to the shaft;

a ring-shaped seal housing mounted about the bearing sleeve and extending into the counterbore, said seal housing having an interior dynamic O-ring sealing the housing to



the bearing sleeve and an exterior static O-ring sealing the housing to the counterbore.

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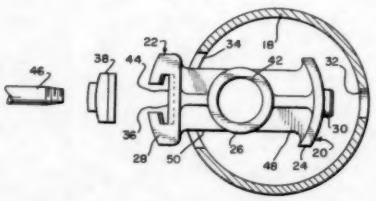
**4,391,475**

## COLUMN INSERT BEARING HOUSING

**Arthur C. Reph, Cherryville, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Filed Jan. 30, 1981, Ser. No. 229,964**
**Int. Cl.³ F16C *23/02***
**U.S. Cl. 384—226** **7 Claims**



1. A column and bearing assembly comprising:

a. a column having a side with an opening and an inside surface;

b. a shaft in the column; and

c. a guide bearing means disposed in the column to support the shaft, the guide bearing means comprising:

(1) a removable housing having a size enabling insertion through the opening in the column and extending into the column, the housing having a first surface contacting the inside surface of the column;

(2) a wear surface for enclosing and supporting the shaft; and

(3) a locking means for attaching and receiving the guide bearing means within the opening to the column.

4,391,476

## ROLLER BEARING

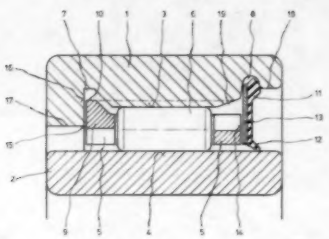
Richard Negele, Esslingen, and Dieter Pfeifle, Filderstadt, both of Fed. Rep. of Germany, assignors to SKF Kugellagerfabriken GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Aug. 1, 1980, Ser. No. 174,641

Claims priority, application Fed. Rep. of Germany, Aug. 9, 1979, 2932290

Int. Cl.³ F16C *33/46*

U.S. Cl. 308—207 R 5 Claims



1. In a rolling bearing with rolling means guided in a cage between inner and outer bearing rings, wherein the cage has a radially extending annular projection on a lateral ring, the projection extending into a first annular groove of one of the bearing rings for restraining the cage in one axial direction, the improvement comprising a second annular groove on the side of said one bearing ring opposite to said first annular groove, said first groove receiving said radial projection of said cage, and a separately formed restraining element inserted in said groove, said restraining ring being positioned to axially restrain said cage with respect to said one of said bearing rings in the axial direction opposite said one axial direction, said one bearing ring having a partial conical shape over which said projection may be pushed to enable insertion of said cage therein to facilitate assembly of said cage in said one bearing ring.

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4,391,477

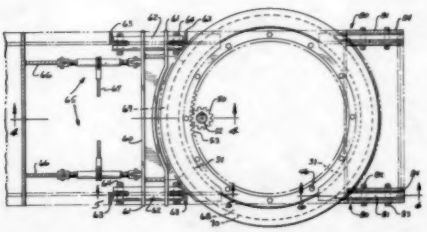
## QUICK RELEASE MOUNTING FOR A TURNTABLE BEARING

James G. Morrow, Sr., Manitowoc, Wis., assignor to The Manitowoc Company, Inc., Manitowoc, Wis.

Filed Dec. 7, 1981, Ser. No. 327,883

Int. Cl.³ F16C *19/10*

U.S. Cl. 308—221 9 Claims



1. A quick release mounting for a turntable bearing of a load handling device or the like comprising, in combination, upper works carried by a rotatable bed, arcuate plates fixedly secured to the bottom of the rotatable bed, a rotatable outer bearing race in engagement with the arcuate plates and providing support for the rotatable bed and upper works, a stationary inner bearing race fixed to a lower works and having gear teeth along its inner circumference, a rotatable pinion gear which engages said gear teeth, said outer bearing race being rotationally supported by the inner bearing race by ball bearings so that as the pinion gear rotates it causes the upper works to rotate along with the outer race relative to the inner race, an arcuate beam slidably mounted on the rotatable bed for engagement with the outer bearing race, means for moving the arcuate beam into and out of engagement with the outer race, a clamping latch pivotably mounted on the rotatable bed so that its one end engages the outer bearing race on the side of the outer race diametrically opposite the arcuate beam, said arcuate beam and clamping latch providing engagement with the outer race to counteract tipping moments of the upper works while at the same time providing for quick engagement and disengagement with the outer race.

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4,391,478

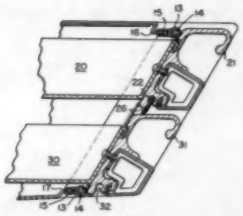
## DRAWER SEAL

Hans C. Grunert, Adelberg, Fed. Rep. of Germany, assignor to Sybron Corporation, Rochester, N.Y.

Filed May 14, 1980, Ser. No. 149,573

Int. Cl.³ A47B *77/00, 87/00, 88/00*

U.S. Cl. 312—320 5 Claims



1. In a storage unit comprising a case, a plurality of drawers arranged in the case in a vertically stacked array, each drawer having a handle for moving the drawer into and out of the case including a first handle attached to a first drawer and a second handle attached to a second drawer stacked immediately below the first, an improved system for sealing between and about the vertically stacked drawers comprising:

(a) each of said handles extending substantially across the full width of its associated drawer and each handle having an upper portion with a relatively flat upper surface and a lower portion;

(b) a flexible seal member carried by and depending from the lower portion of said first handle, said sealing member being adapted to contact the flat upper surface of said second handle along substantially the full width of said second handle when the drawers associated with said first and second handles are closed; and

(c) sealing means on said cabinet extending about the periphery of said vertically stacked array of drawers, said sealing means contacting the upper portion of the upper-most handle in said drawer array, the lower portion of the lower-most handle in said drawer array and the side edges of each handle in said drawer array.

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4,391,479

## MINIATURE MATRIX PROGRAMMING BOARD

Kenneth R. Wessel, White Plains, N.Y., assignor to Sealectro Corporation, Mamaroneck, N.Y.

Filed Apr. 9, 1981, Ser. No. 252,429

Int. Cl.³ H01R *29/00*

U.S. Cl. 339—18 C 15 Claims

1. A matrix connector for selectively connecting a cross bar in a first series of parallel bars with a similar cross bar in a second series of parallel bars comprising:

(a) an insulator block for supporting both series of parallel bars, formed with a plurality of spaced cylindrical aper-

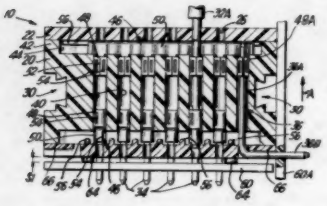
tures connecting two planar surfaces and arranged in two orthogonal lines;

(b) a first series of elongated conductive bars in parallel array, each bar in the first series including a strip of conductive material formed with alternate ridges and grooves along its longitudinal axis and including a plurality of depending cylindrical sockets having resilient clamping walls, said sockets positioned in one end of the cylindrical apertures in the insulator block;

(c) a second series of elongated conductive bars also in parallel array but perpendicular to the first series, each bar in the second series including a strip of conductive material formed with alternate ridges and grooves along its longitudinal axis and including a plurality of depending cylindrical sockets having resilient clamping walls, said sockets positioned in the other end of the cylindrical apertures in the insulator block;

(d) a first cover plate secured to one side of the insulator block for covering one series of cross bars, said cover plate formed with a plurality of apertures positioned in alignment with the apertures in the insulator block for the insertion of connecting pins;

(e) a second cover plate secured to the other side of the insulator block for covering the second series of cross bars, said second cover plate formed with a plurality of apertures positioned in alignment with the apertures in the



insulator block for the insertion of connecting pins, said second cover plate further including termination holes, disposed adjacent the side edges thereof, said termination holes being aligned with apertures in said insulator block having only one socket of a single conductive bar therein, said termination holes for the insertion of termination pins, with the outer surface of said second cover plate further including a plurality of grooves, each groove being associated with a termination hole and being contiguous therewith, each said groove extending away from the associated termination hole to the side edge of said second cover plate;

(f) a plurality of conducting connecting pins for insertion through the apertures in either cover plate to make contact with a socket in the first series of bars and a socket in the second series of bars; and

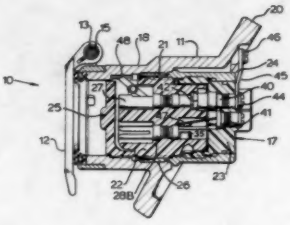
(g) a plurality of termination pins being generally L-shaped in configuration having first and second legs disposed in perpendicular relationship, with the diameter of said L-shaped termination pins substantially conforming to the depth of said grooves in said second cover plate wherein one leg of said L-shaped termination pin is receivable in a termination hole making electrical contact with one socket of a single conductive bar and with the other leg of said termination pin being receivable in the associated groove in such a manner to be flush with the planar outer surface of said second cover plate.

**4,391,480**

## ELECTRICAL TERMINAL

**Nabil L. Minn, Roselle, Ill., assignor to Appleton Electric Company, Chicago, Ill.**

**Filed Nov. 10, 1980, Ser. No. 205,884**
**Int. Cl.³ H01R *27/00***
**U.S. Cl. 339—32 R** **1 Claim**



1. In combination with an explosionproof electrical receptacle and switch, said receptacle and switch including a faceplate with a first slot and a second slot therein, one of said slots arranged to receive a male blade contact in either of two mutually perpendicular orientations; an improved terminal block subassembly behind said faceplate and said one slot, comprising:

a terminal block having a front side and a rear side, an elongate and essentially singular piece of electrically conductive metal captivated partially within said terminal block and having a first end protruding from said terminal block front side and a second end protruding from said terminal block rear side,

said first end being slotted longitudinally in two mutually perpendicular planes for receiving said male blade contact in either of said two orientations,

said second end being a switch contact,

and means between said first end and said second end for holding said terminal in said terminal block.

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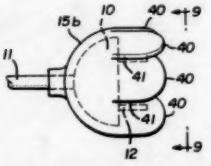
**4,391,481**

## CHILD-PROOF ELECTRICAL PLUG SHEATH

**Theodore A. Golden, 755 W. Big Beaver Rd., Suite 211, Troy, Mich. 48084**

**Filed Mar. 30, 1981, Ser. No. 249,198**
**Int. Cl.³ H01R *13/44***
**U.S. Cl. 339—42** **1 Claim**



1. A child-proof protective sheath for a conventional electrical plug of the type having a plug body with an electrical wire extending into and connected within the body, and having electrical contact prongs extending from the body for insertion within corresponding openings formed in a wall-type receptacle, comprising:

a thin wall, generally tubular shaped member, formed of a resilient, rubber-like material, and being of a size to closely surround and engage the plug body adjacent the prongs for mounting upon the plug body, and for axially extending from the plug body for substantially the full length of the prongs to a free end, so as to encircle the prongs and

form a protective wall which is spaced radially outwardly of the prongs;

said member being resiliently collapsable and extendable in its axial direction upon endwise pressure and release of endwise pressure, respectively, so that during the time that the plug prongs are inserted within and removed from the receptacle openings, the member completely encircles the space between the plug and receptacle to prevent child access to exposed portions of the prongs, and simultaneously the axial pressure between the contacting portion of the receptacle and the free end of the member results in endwise collapsing of the member during insertion of the prongs and the release of said pressure, during removal of the prongs from the openings, results in the member resiliently extending to its normal length, and the free end portion of said member at the prongs, being sufficiently resilient to spread radially outwardly in response to the pressure of contacting the receptacle during insertion of the prongs within the openings for thereby producing the axial collapse in length in the member;

said member including a roughly bell-shaped end to completely receive the plug body, and said bell-shaped end having a central opening through which the plug electrical wire extends, and said bell-shaped end tightly fits around and against the plug body for frictionally securing the member upon the plug body; and

said member including a plurality of separate, petal-like sections each having opposed generally straight edges connected by a curved end, the edges of each petal-like section overlapping the edges of adjacent sections, and said petal-like sections radially bending and spreading during contact with the receptacle for forming a closed wall.

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**4,391,482**

## SPRING STRIPS FOR CONNECTIONS BETWEEN PRINTED CIRCUIT BOARD

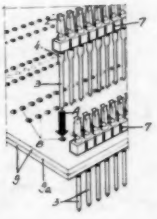
**Franz Czeschka, Talstrasse 7, Rechberghausen, Fed. Rep. of Germany (D7324)**

**Filed Apr. 23, 1979, Ser. No. 32,126**

**Claims priority, application Switzerland, Apr. 21, 1978, 4318/78**

**Int. Cl.³ H01R *11/22***

**U.S. Cl. 339—59 M** **3 Claims**



1. A spring strip for making electrically conducting, vibration-stable and gasproof connections between the printed back wall wiring of through-contacted printed circuit boards, and the actual contact springs, the latter being combined via an insulating mount with mutual spacing to strips of at least one row, and these in turn being surrounded by a housing (10) placed thereon, characterized in that the individual strips consisting of contact springs (1) and insulating retention strip (6) clad together;

said insulating strip (6) having lines of weakness formed between pairs of adjacent contact springs, whereby the strip can be broken off at any desired number of contact springs;

said housing (10) having cross pieces (14) that bear against said insulating retention strip (6) between each of the contact springs (1), forming chambers (11).

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**4,391,483**

## SEALING SLEEVE FOR USE WITH ELECTRICAL CONNECTORS

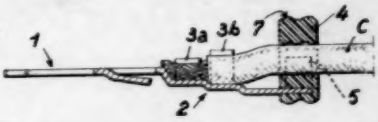
**Dominique E. Desourteaux, Epernon, France, assignor to Societe Anonyme Francelco, Suresnes, France**

**Filed Mar. 19, 1981, Ser. No. 245,493**

**Claims priority, application France, Mar. 28, 1980, 80 06963**

**Int. Cl.³ H01R *4/00***

**U.S. Cl. 339—94 R** **3 Claims**




1. An improved sealing system for use with cooperating electrical connectors for placing two cables in contact, each of said cables having an insulator sheath and being inserted in a lodging in one of said connectors with a resulting space between the outer diameter of said insulator sheath and the inner diameter of said electrical connector, said sealing system comprising:

(a) an electrical contact having a contact element and a tail portion, said tail portion being adapted to be crimped onto one of said cables;

(b) a flexible sealing sleeve molded onto the tail portion of said electrical contact, said flexible sealing sleeve being in the form of a cylindrical grommet with a concentric orifice therein, the outer diameter of said grommet being slightly less than the inner diameter of said lodging, and the diameter of said orifice being slightly greater than the outer diameter of said insulator sheath, wherein annular grooves encircle the outer peripheral surfaces of said grommet and said orifice, said sealing sleeve being adapted to seal the said space;

(c) said tail portion comprising means for further securing said sealing sleeve thereon.

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**4,391,484**

## BOX CONNECTOR

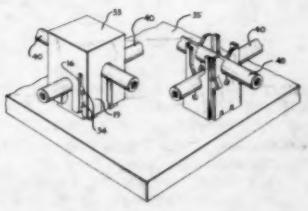
**Wilhelmus T. M. Foederer, Best, Netherlands, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Apr. 10, 1981, Ser. No. 252,881**

**Claims priority, application Netherlands, Jun. 26, 1980, 8003708**

**Int. Cl.³ H01R *13/38***

**U.S. Cl. 339—97 P** **6 Claims**



1. A box connector having insulation piercing contacts, characterized by a four side wall box made of electrically conductive sheet material, two corresponding pairs of slots in opposite side walls containing insulation piercing contacts said slots extending from the top of the box over a predetermined

length towards the bottom of said box, each pair of slots terminating in a same level but at a different level with respect to the other pair of slots, a pair of connecting strips formed adjacent the bottom edge of said box in opposite side walls, each said strip initially converging and subsequently extending downwardly and adjacent to each other to form a means for mounting in a printed circuit board hole.

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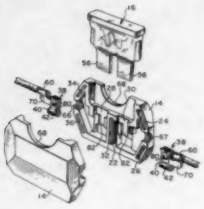
**4,391,485**

## IN-LINE FUSE HOLDER FOR MINIATURE PLUG-IN FUSE

**Angelo Urani, St. Louis, Mo., assignor to McGraw-Edison Company, Rolling Meadows, Ill.**

**Filed Jan. 9, 1981, Ser. No. 223,893**
**Int. Cl.³ H01R** *13/115, 19/48*
**U.S. Cl. 339—191 S** **10 Claims**



1. An in-line fuse holder for receiving a miniature, plug-in fuse having a fusible element coupled between a pair of juxtaposed, laterally spaced co-planar, parallel generally flat fuse terminals, said in-line fuse holder including in combination:

a casing of insulative material having rigid wall surfaces, two clip assemblies mounted within said casing, each for engaging one of said flat fuse terminals of said plug-in fuse, each said clip assembly including first clip means of electrically conductive material, said first clip means being generally U shaped with legs of the U forming blades between which said flat fuse terminals are to be received, second clip means of resilient material, said second clip means being generally U shaped with the legs of the U forming blades and dimensioned for cooperating engagement with said first clip means in a tightly fitting overlying relationship with respect thereto, said second clip means including a tang extending outwardly from the surface of each of said blades of said second clip means for engagement with said rigid wall surfaces of said insulative casing, said tang and said rigid wall surfaces cooperating to increase the gripping force provided by said blades of said second clip means against the blades of said first clip means thereby to urge said blades of said first clip means into low electrical resistance contacting engagement with said fuse terminals and means extending from said first clip means for permanent external in-line electrical connection of said fuse holder.

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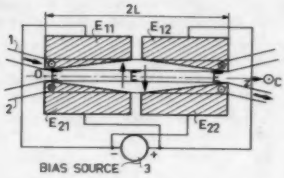
**4,391,486**

## ELECTRICALLY CONTROLLED ELECTRO-OPTICAL SWITCH AND INTEGRATED OPTICAL CIRCUIT INCORPORATING SUCH A SWITCH

**Michel Papuchon, and Claude Puech, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Sep. 5, 1980, Ser. No. 184,616**
**Claims priority, application France, Sep. 6, 1979, 79 22297**
**Int. Cl.³ G02B** *5/14*
**U.S. Cl. 350—96.14** **8 Claims**

1. An electrically controlled electro-optical switch incorporating two wave guides formed in an electro-optical material and electrodes producing an electrical field for modulating the velocity of the optical radiation propagated by said guides into adjacent portions in order to effect an energy transfer as a function of a control voltage, wherein the intensity of the modulating electrical field created by the electrodes increases along said adjacent portions on moving away from the centres




thereof, the electrical field orientations on either side of said centres being the same in one switching state and reversed in the other switching state.

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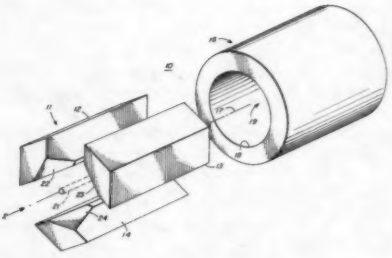
**4,391,487**

## OPTICAL FIBER CENTERING DEVICE

**Paul Melman, Newton, and W. John Carlsen, Boston, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.**

**Filed Jan. 7, 1981, Ser. No. 223,192**
**Int. Cl.³ G02B** *5/14*
**U.S. Cl. 350—96.20** **11 Claims**



1. An optical fiber centering device comprising

(a) fiber receiving means having three sections, wherein each of said three sections is substantially identical to each other, and wherein each of said sections has a uniform cross-sectional configuration at right angles along a major portion of its length forming a boundary of fixed perimeter, and

(b) a receiving member having an axial centrosymmetric surface of revolution with respect to a fixed axis, said member having a cylindrical, concentric recess therewithin for holding said sections in assembled relationship, wherein said boundary of one of said sections includes a first portion adapted to mate with a matable portion of said boundary of a second of said sections, said boundary of said one of said sections includes a second portion adapted to mate with a matable portion of said boundary of a third of said sections, said boundary of said one of said sections includes a third portion contiguous to said first portion and said second portion for engaging an optical fiber along said length, and said boundary of said one of said sections includes a fourth portion contiguous to said first portion and said second portion but not to said third portion for engaging the cylindrical wall defined by said concentric recess, wherein said recess terminates with a planar wall perpendicular to said axis, and wherein said fourth portion engages said cylindrical wall along a fraction of said fourth portion,

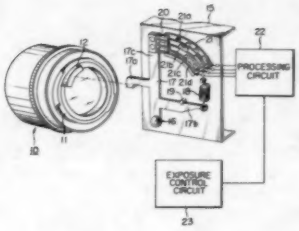
said device being adapted to hold an optical fiber along said axis.

4,391,488

## MOUNT DEVICE OF AN INTERCHANGEABLE LENS

Sunao Ishizaka, and Toshiaki Hozumi, both of Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Aug. 11, 1980, Ser. No. 177,356
Claims priority, application Japan, Sep. 11, 1979, 54/115752
The portion of the term of this patent subsequent to Feb. 9, 1999, has been disclaimed.
Int. Cl.³ G02B 7/02; G03B 7/20
U.S. Cl. 350—257 9 Claims




1. In a lens system comprising an interchangeable lens having a mount mountable on a camera having an electric circuit associated with exposure control and a displaceable actuating member for correcting said electric circuit so as to be accommodated to the focal length of the interchangeable lens mounted, and a conversion lens having an optical system for converting the focal length of said interchangeable lens and mountable between said interchangeable lens and the camera, the improvement comprising:

a signal member provided on said interchangeable lens projectedly from one end of said mount and engageable with said actuating member so as to close said displacement when said interchangeable lens is mounted on the camera through said mount, said signal member having an engaging end portion engageable with said actuating member, said engaging end portion lying at a position determined relative to said mount for displacing said actuating member by an amount proportional to the logarithm of the focal length of said interchangeable lens; and

a transmission member provided on said conversion lens and positioned between said signal member and said actuating member when said conversion lens is mounted, said transmission member being slidable by said signal member by an amount corresponding to the position of said engaging end portion and displacing said actuating member by an amount proportional to the logarithm of said focal length converted in response to said sliding and the mounting of said conversion lens onto the camera.

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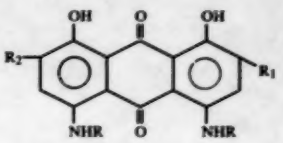
4,391,489

## LIQUID CRYSTAL MATERIALS CONTAINING PLEOCHROIC ANTHRAQUINONE DYES

Kenneth J. Harrison, Malvern Link; Edward P. Raynes, Malvern; Frances C. Saunders, Malvern Wells, and David J. Thompson, Whitefield, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Jul. 27, 1981, Ser. No. 287,123
Claims priority, application United Kingdom, Jul. 29, 1980, 8024761
Int. Cl.³ G02F 1/13; C09K 3/34
U.S. Cl. 350—349 25 Claims

1. A material suitable for a guest-host liquid crystal device comprising a solution of a liquid crystal material and a pleochroic dye wherein the pleochroic dye comprises at least one compound having a formula:




wherein R is H or lower alkyl; and each of $R_1$ and $R_2$ independently represents alkyl containing between 1 and 10 carbon atoms.

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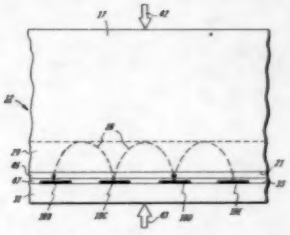
4,391,490

## INTERFACE FOR PROXIMITY COUPLED ELECTRO-OPTIC DEVICES

David H. Hartke, Los Angeles, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 2, 1981, Ser. No. 250,478
Int. Cl.³ G02F 1/03
U.S. Cl. 350—356 6 Claims



1. In an electro-optic device including an electro-optic element, a plurality of electrodes for applying encoded data samples, and means for urging the plurality of electrodes toward a surface of the electro-optic element, the improvement comprising:

a plurality of conductors applied to said surface of said electro-optic element, said conductors being aligned in substantially the same direction as said electrodes.

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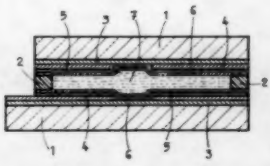
4,391,491

## PASSIVE ELECTRO-OPTIC DISPLAY CELL AND METHOD OF MANUFACTURING THEREOF

William G. Freer, Saint-Blaise, Switzerland; John C. Varney, Staines, England, and John H. Williamson, Neuchatel, Switzerland, assignors to Ebauches Electroniques, S.A., Canton of Neuchatel, Switzerland

Filed Jun. 18, 1980, Ser. No. 160,748
Int. Cl.³ G02F 1/13
U.S. Cl. 350—341 10 Claims



1. A passive electro-optic display cell comprising two glass plates, a frame positioned between the plates and by which the plates are maintained at a fixed spacing one from the other to provide an enclosed space surrounded by said frame, a liquid

crystal imprisoned within said space, control electrodes respectively carried by said plates on the facing inner sides thereof and, on the inner side of each electrode, an alignment layer for alignment of the molecules of an active constituent of said liquid crystal, said frame and said alignment layers being composed of polymerizable substances said substances having been polymerized simultaneously to produce interpolymerization thereof resulting in close chemical bonding between said frame and said alignment layers which thus together form a wall which completely encloses the liquid crystal and shelters it from external influences.

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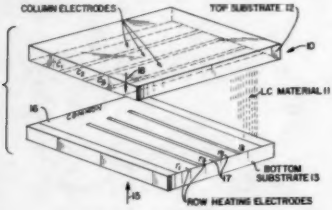
**4,391,492**

## THERMALLY ADDRESSED CHOLESTERIC-SMECTIC LIQUID CRYSTAL DEVICE

**Sun Lu, San Jose, and David B. Chung, Santa Clara, both of Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Apr. 6, 1981, Ser. No. 251,247**
**Int. Cl.³ G02F *1/13***
**U.S. Cl. 350—351** **134 Claims**




1. A thermally addressed visual device which provides a dark image against a lighter background comprising:

A liquid crystal medium including at least one liquid crystal cholesteric compound mixed with at least one pleochroic dye of high order parameter and having dielectric anisotropy, said medium being thermally sensitive and having a transition between at least two thermal phases, an upper thermal phase being a cholesteric phase and a lower thermal phase being a smectic phase, said medium having two possible light modulating states in said smectic phase, a first light state being normally substantially light absorbing and a second light state being substantially transparent; and means to apply a sensitizing voltage to address portions of said medium to develop said second light transparent state when said medium passes rapidly into said smectic phase, the remaining portions of said medium developing said first substantially light absorbing state.

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**4,391,493**

## METHOD TO INCREASE FOCAL DISTANCE AT TELEPHOTOGRAPHIC SIDE OF A ZOOM LENS SYSTEM

**Akira Tajima, Kawasaki, and Sadahiko Tsuji, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Japan**

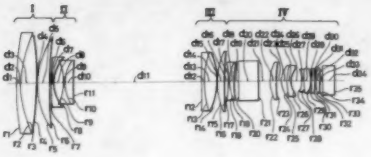
**Filed Nov. 15, 1976, Ser. No. 741,789**
**Claims priority, application Japan, Nov. 18, 1975, 50/138500**
**Int. Cl.³ G02B *15/02, 15/16***
**U.S. Cl. 350—422** **10 Claims**

1. A method of increasing the focal length at the telephotographic end of a zoom lens sytem, having first focusing means and second focusing means, and comprising the following steps:

(a) the step of making the lateral magnification of a zoom lens system zero with said first focusing means;

(b) the second step of bringing the lateral magnification of the zoom lens from zero to a definite value $\beta$ by activating the second focusing means while maintaining the first focusing means at a standstill; and

(c) the third step of providing an attachment lens having length fA in front of said zoom lens system having a lateral magnification $\beta$, and making the lateral magnification of the composite lens system of said attachment lens and the



zoom lens zero without moving a lens group in the zoom lens system,

whereby the product $fA \times \beta$ of said lateral magnification $\beta$ and the focal length fA of the attachment lens is longer than the focal length at the telephotographic end of the zoom lens system.

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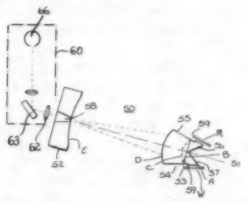
**4,391,494**

## APPARATUS FOR PROJECTING A SERIES OF IMAGES ONTO DIES OF A SEMICONDUCTOR WAFER

**Ronald S. Hershel, Albany, Oreg., assignor to General Signal Corporation, Stamford, Conn.**

**Continuation of Ser. No. 264,171, May 15, 1981, abandoned.**
**This application Jul. 21, 1982, Ser. No. 400,536**
**Int. Cl.³ G02B *17/08***
**U.S. Cl. 350—442** **16 Claims**



1. A unit magnification, achromatic, anastigmatic optical projection system of the catadioptric type particularly suited for use in microlithography, said projection system comprising:

a concave, spherical reflecting surface having an optical axis and a first center of curvature;

an achromatic lens positioned between said reflecting surface and said first center of curvature, said achromatic lens comprising a meniscus lens made from a light flint glass, said meniscus lens having a first convex surface facing said reflecting surface, said first convex surface having a second center of curvature on the opposite side of said first center of curvature from said meniscus lens, said meniscus lens also having a concave surface facing away from said reflecting surface, said concave surface having a third center of curvature on the same side of said first center of curvature as said meniscus lens;

said achromatic lens also comprising a plano-convex lens made from a dense flint glass, said plano-convex lens having a second convex surface facing said concave surface, said second convex surface having a fourth center of curvature on the same side of said first center of curvature as said plano-convex lens, said plano-convex lens also having a first flat surface away from said reflecting surface, said first flat surface being positioned closer to said second convex surface than either of said third and fourth centers of curvature; and

said a chromatic lens further comprising first and second prisms for coupling light to and from separate fields on said first flat surface, said prisms being made from a dense crown glass and having an optical path length such that the image and object planes of the projection system are on the opposite side of said second center of curvature from said first flat surface, each of said prisms also comprising a second flat surface facing one of said image and object planes, said second flat surfaces being positioned closer to said first center of curvature than either of said third and fourth centers of curvature.

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**4,391,495**

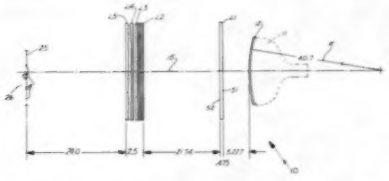
## IMAGE DISPLAY SYSTEM

**Anthony R. Mazurkewitz, Middlevillage, N.Y., assignor to The Austin Company, Cleveland, Ohio**

**Filed Jun. 2, 1981, Ser. No. 269,622**

**Int. Cl.³ G02B *3/08***

**U.S. Cl. 350—452** **10 Claims**



1. An optical system for a visual display comprising:

means for projecting a visual image along a central axis;

a first fresnel lens for receiving said visual image, said first fresnel lens having fresnel grooves facing said means for projecting;

second and third fresnel lenses forming a liquid doublet first fresnel lens pair disposed in front of said first fresnel lens, said first fresnel lens pair having fresnel grooves facing each other and a liquid disposed therebetween, said liquid having predetermined indexes of refraction and dispersion for color correcting the system;

fourth and fifth fresnel lenses forming a second fresnel lens pair disposed in front of said first fresnel lens pair, said second fresnel lens pair having fresnel grooves facing each other;

said first, second, third, fourth and fifth fresnel lens being centered on said central axis and extending perpendicular thereto;

said fresnel grooves being comprised of annular facets having a slope determined by dz/dr where:

$$z = \frac{Cr^2}{1 + \sqrt{1 - (K+1)C^2r^2}} + Dr^4 + Er^6 + Fr^8 + Gr^{10}$$

and C equals the curvature of said annular facets; r equals the radical position of said facets; K equals a conic constant determined by the physical characteristics of said lenses; and D, E, F and G are aspheric terms which determine the aspheric characteristics of said lenses.

**4,391,496**

## ADJUSTMENT DEVICE FOR A PANCRATIC OBJECTIVE OF A STEREOMICROSCOPE

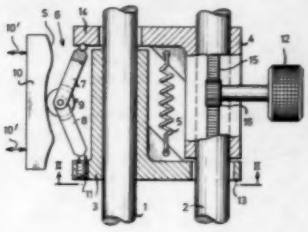
**Albert Schilling, Aalen, and Wolfgang Schob, Oberkochen, both of Fed. Rep. of Germany, assignors to Carl Zeiss-Stiftung, Oberkochen, Fed. Rep. of Germany**

**Filed Jan. 28, 1981, Ser. No. 229,194**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1980, 8003643[U]**

**Int. Cl.³ G02B *15/16***

**U.S. Cl. 350—519** **4 Claims**



1. An adjustment device for pancratic objectives, particularly for stereomicroscopes, comprising:

first and second lens group holders, said first and second holders being displaceable differing amounts in the same direction along the optical axis of said objectives;

a variable-length connecting element coupling said first and second holders, said connecting element including a first arm pivotally joined to said first holder, a second arm pivotally joined to said second holder, said first and second arms being pivotally joined to each other to form a pivot point;

cam follower means disposed at said pivot point of said arms;

external cam means disposed for engagement with said cam follower means;

means for biasing said first and second holders together and to bias said cam follower means into engagement with said cam means; and

means for displacing at least one of said first and second holders along said optical axis.

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**4,391,497**

## APERTURE STOP FOR MICROSCOPE CONDENSERS

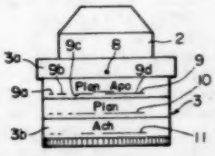
**Michio Imada, Kodaira, and Masayuki Naito, Mitaka, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Dec. 1, 1980, Ser. No. 211,949**

**Claims priority, application Japan, Dec. 7, 1979, 54-168762[U]**

**Int. Cl.³ G02B *21/08***

**U.S. Cl. 350—523** **2 Claims**




1. A microscope assembly including a plurality of objectives of different magnification, a condensor, and an aperture stop mounted to a lower part of said microscope condensor and comprising a fixed member having an index mark on the outer surface thereof and having a rotatable stop ring, each of said plurality of objectives having a unique color marking thereon, each different from the other and indicative of the respective

magnifications thereof, said rotatable stop ring of said aperture stop being provided with a plurality of unique color markings thereon equal in number to the number of the plurality of objectives and fixed in predetermined locations on said stop ring one of each of the unique color markings on said stop ring being identical in color marking to the unique color marking of one of the objectives, whereby when a particular objective having a particular unique color marking is in use, and said stop ring is positioned such that an identical one of said unique color markings on said stop ring is opposite the index mark, that the aperture diameter of said aperture stop corresponds to the numerical aperture of the particular objective in use.

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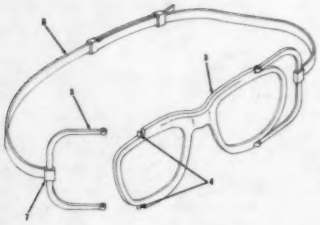
**4,391,498**

## SPECTACLE FRAME

**Roy H. Rengstorff, 4844 Austin Rd., Aberdeen Proving Ground, Md. 21010**

**Filed Jul. 20, 1979, Ser. No. 59,923**
**Int. Cl.³ G02C** *5/14, 5/22*
**U.S. Cl. 351—121** **46 Claims**



1. An eye protective frame comprising:

a. rim means defining a pair of spaced, side-by-side viewing windows and a bridge therebetween, said bridge adapted to engage the face of a wearer;

b. temple yoke support means attached to said rim means both above and below said viewing windows and inboard of the outer extremities of said rim means opposite said bridge a distance sufficient to provide for close proximity to the temple contour of the wearer's head upon support of said rim means in position on the wearer's face; and

c. securing means connected to said temple yoke support means for securing the frame to the wearer with said temple yoke support means in close proximity to the temple contour of the wearer's head.

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**4,391,499**

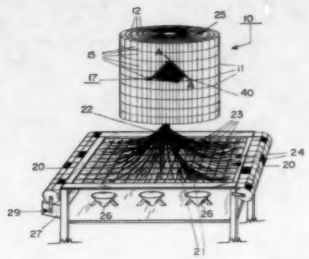
## IMAGE PROJECTOR

**William C. Whitlock, III, 1119 Grayland St., Greensboro, N.C. 27408**

**Filed Mar. 8, 1982, Ser. No. 356,235**
**Int. Cl.³ G03B** *21/00*
**U.S. Cl. 353—122** **18 Claims**

1. An image projector for displaying three-dimensional forms comprising: a plurality of three-dimensional modules, at least one of said modules aligned in each of the three-dimensional directions relative to the other of said modules, said modules being constructed of unidirectional light-transmitting material, illuminating means, said illuminating means being positioned within said modules, transmission means, said transmission means for directing energy to said illuminating means, and energy input means, said energy input means communicating with said transmission means whereby illuminating certain of said modules provides a three-dimensional form.

13. A method of forming a three-dimensional image comprising the steps of: providing a plurality of three-dimensional modules having at least one module aligned in each of the three-dimensional directions relative to the other of said modules, said modules having walls constructed of unidirectional



light-transmitting material and selectively illuminating certain of said modules to thereby form a three-dimensional image.

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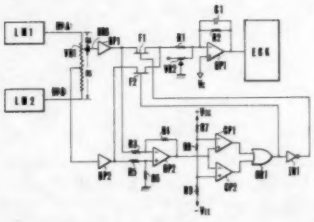
**4,391,500**

## CAMERA WITH EXPOSURE MEASURING SYSTEM

**Tokuichi Tsunekawa, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Japan**

**Filed Nov. 20, 1981, Ser. No. 323,428**
**Claims priority, application Japan, Nov. 25, 1980, 55-165550; Nov. 25, 1980, 55-165551; Nov. 25, 1980, 55-165552; Nov. 25, 1980, 55-165559; Nov. 25, 1980, 55-165560; Feb. 9, 1981, 56-17819**
**Int. Cl.³ G03B** *7/081, 17/20*
**U.S. Cl. 354—31** **13 Claims**



1. A light measuring system for a camera including:

(a) 1st light measuring means for measuring the brightness of an object to be photographed in a predetermined area, said means producing an electrical signal representing the brightness of the predetermined area of the object;

(b) 2nd light measuring means for measuring the brightness of the object in a different area from that for said 1st light measuring means,

said means producing an electrical signal representing the brightness of the different area of the object from that for said 1st light measuring means;

(c) measuring pattern setting means;

(d) computing means responsive to the outputs of said 1st and said 2nd light measuring means,

said means producing a 1st output representing a combination of the outputs of said 1st and said 2nd light measuring means in a certain adjusted relationship by said light measuring pattern setting means, and a 2nd output representing a combination of the outputs of said 1st and said 2nd light measuring means in a fixed relationship;

(e) comparing means for comparing said 1st and said 2nd outputs of said computing means with each other,

said means producing a 1st signal when the difference between the computed outputs is smaller than a predetermined value, and a 2nd signal when the difference

between the computed outputs is larger than the predetermined value;

(f) exposure control means for controlling exposure in accordance with either one of said 1st and 2nd computed outputs; and

(g) control means for applying either one of said 1st and said 2nd computed outputs to said exposure control means, said means responsive to said 1st signal from said comparing means applying said 1st computed output to said exposure control means, and responsive to said 2nd signal from said comprising means applying said 2nd computed output to said exposure control means.

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**4,391,501**

## CAMERA WITH ATTACHABLE FLASH DEVICE

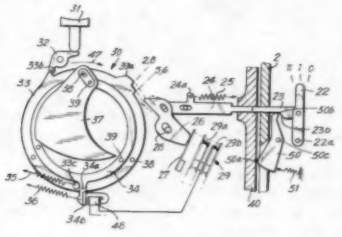
**Karl-Heinz Lange, Bunde, Fed. Rep. of Germany, assignor to Balda-Werke Photographishe Gerate und Kunststoff GmbH & Co., KG, Bunde, Fed. Rep. of Germany**

**Filed Sep. 4, 1981, Ser. No. 299,455**

**Claims priority, application Fed. Rep. of Germany, Sep. 5, 1980, 3033463**

**Int. Cl.³ G03B *15/03***

**U.S. Cl. 354—149** **16 Claims**



1. A camera and attachable flash device in combination, comprising:

a camera body including a lens and shutter assembly;

camera on-off means for placing the camera in an operational or non-operational condition;

a flash device adapted to be mounted on the camera body and coupled to the lens and shutter assembly, the flash device including an on-off switch for placing the flash device in an operational or non-operational condition; and

transfer means coupling said lens and shutter assembly to the on-off switch of the flash device for operatively setting the lens and shutter assembly at an appropriate flash setting and for placing the flash device into the off position in response to the camera on-off means being placed in a non-operational position.

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**4,391,502**

## ELECTROPHOTOGRAPHIC APPARATUS HAVING MEANS FOR ADJUSTING THE REPRODUCTION PROPERTIES OF SUBSEQUENT COPIES AFTER A FIRST COPY HAS BEEN PRODUCED

**Masaji Nishikawa, Hachioji, Japan, assignor to Olympus Optical Company Limited, Tokyo, Japan**

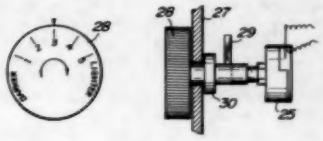
**Continuation of Ser. No. 940,657, Sep. 8, 1978, abandoned. This application Sep. 26, 1980, Ser. No. 191,356**

**Claims priority, application Japan, Sep. 12, 1977, 52-108909**

**Int. Cl.³ G03G *15/00***

**U.S. Cl. 355—3 DD** **2 Claims**

1. An electrophotographic apparatus comprising a housing, an electrostatic charge retentive member, means for forming on the charge retentive member an electrostatic charge latent image, means for developing the electrostatic latent image while applying a development bias voltage to form a toner image, means for transferring the toner image to a record medium, means for successively repeating said development and transfer to form a plurality of duplicated copies from the electrostatic latent image formed on the electrostatic charge retentive member, means for adjusting the development bias voltage including a manually operable means accessible externally of the apparatus to enable the development bias voltage to be adjusted during the repeated development and transfer after the formation of the electrostatic charge latent image to change the density of the duplicated copies, while the electrostatic charge latent image once formed remains on the charge retentive member, and means for adjusting the amount of exposure light before the formation of the electrostatic latent image, said exposure amount adjusting means and said development bias voltage adjusting means being coupled to a common handling member such that, when said common handling member is operated in one direction, the exposure amount is decreased and the development bias voltage is decreased and, when said common handling member is operated in another direction, the exposure amount is increased and the development bias voltage is increased, said common handling member comprising a common dial rotatably arranged on said housing and said development bias voltage adjusting means comprising a variable resistor having a rotating axis coupled to said common dial by means of a rotating shaft secured to the common dial.



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**4,391,503**

## MAGNETIC BRUSH DEVELOPER UNIT FOR PHOTOCOPIER

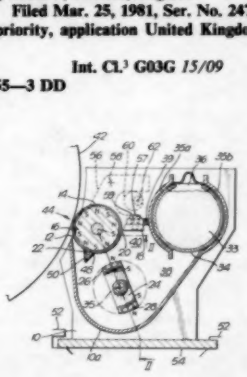
**Robert J. Pugh, London, England, assignor to Gestetner Manufacturing Limited, London, England**

**Filed Mar. 25, 1981, Ser. No. 247,309**

**Claims priority, application United Kingdom, Apr. 2, 1980, 8011042**

**Int. Cl.³ G03G *15/09***

**U.S. Cl. 355—3 DD** **9 Claims**



1. In a magnetic brush developer unit for a photocopier, comprising:

(a) a developer shell for supporting a magnetic brush of single component toner in use of the developer unit;

(b) a housing defining a sump below the level of said developer shell to contain toner for forming a magnetic brush of toner on said shell;

(c) aperture means to said housing defining a development zone at which the magnetic brush can project from the housing;

(d) a magnetic roller within the developer shell, setting up a magnetic field around the developer shell;
(e) means operable to drive at least one of the developer shell and the roller for rotation about a longitudinal axis;
(f) a scraper blade positioned in said housing and directed so as to remove toner from said developer shell after the toner has been carried past said development zone on the developer shell;
(g) a rotatable magnetic member positioned within the housing below the level of said developer shell; and
(h) means for driving said rotatable magnetic member in use of the developer unit, for rotation to entrain toner received from said scraper blade; the improvement wherein:
(i) said rotatable magnetic member includes magnet means for magnetically attracting and holding toner on a surface of said rotatable magnetic member so that a clump of loosely held toner is formed on the surface of said magnetic member, the clump being movable through said sump along a circular path in contact with the toner in said sump, to carry said toner upwardly to join a stream of toner being applied to said developer shell, said toner being conveyed to a location wherein the magnetic field around said developer shell magnetically attracts toner from exterior portions of the clump, thereby avoiding mechanical agitation and coagulation of said toner.

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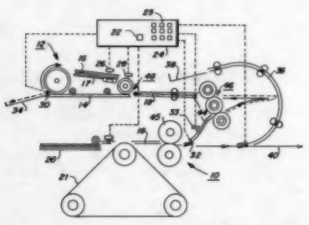
**4,391,504**

## RECIRCULATING COPY DOCUMENT

**Thomas Acquaviva, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Oct. 5, 1981, Ser. No. 308,861**
**Int. Cl.³ G03G *21/00***
**U.S. Cl. 355—3 SH** **7 Claims**



1. In a precollation copier with a recirculating document handler in which a set of plural original document sheets is placed and normally plurally recirculated and copied once per circulation at the copier imaging station to produce a selected plural number of precollated copy sheet sets therefrom in a normal copy sheet output path with a copy fuser, the improvement comprising:

a selectable alternative copy sheet path for feeding copy sheets from said normal copy sheet output path of said copier into an input station of said recirculating document handler;

selectably actuatable copy sheet output path deflector means for diverting only a first set of copy sheets made from original document sheets from said normal copy sheet output path into said alternative copy sheet path to said recirculating document handler; in which said alternative copy sheet path extends directly from the fuser of said copier into said recirculating document handler upon the actuation of said copy sheet output path deflector means;

selectable non-circulating means in said recirculating document handler for automatically ejecting the original document sheets from said recirculating document handler after said original document sheets have been copied only once, and before said original document sheets are recirculated, even though plural copy sets have been selected to be made therefrom;

and means for automatically plurally recirculating said first set of copy sheets in said recirculating document handler in lieu of and as if they were said original document sheets to copy the remainder of the selected number of plural copy sets from said first set of copy sheets rather than said original document sheets.

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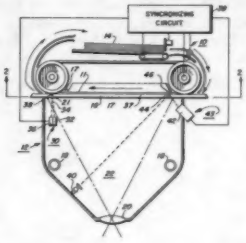
**4,391,505**

## OVER-PLATEN DOCUMENT REGISTRATION APPARATUS

**Morton Silverberg, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Oct. 19, 1981, Ser. No. 312,461**
**Int. Cl.³ G03G *15/04***
**U.S. Cl. 355—3 R** **12 Claims**




1. In an original document sheet feeding and registration apparatus for a copier, in which a document sheet is fed with a document feeding belt having a diffusely light reflective surface over a transparent platen imaging station of the copier, said imaging station having a document illumination exposure system and a copying lens system under the platen, the improvement comprising:

at least one minor spectrally reflective patch on said otherwise diffusely light reflective surface of said document belt,

means for feeding the document sheets onto said belt in synchronism with said spectral patches such that at least one edge of the document sheet only partially overlies said patch and a portion of said spectral patch is exposed,

and a photosensor system for detecting an edge of the document sheet while the document sheet is over said platen and within said imaging station and within the field of view of said lens system, said photosensor system being optically invisible to said copier,

said photosensor system comprising sensor illumination means distinct from said exposure illumination system and photosensor means aimed at a registration position on said platen for detecting changes in the light level from said sensor illumination means reflected from said spectral patch,

and wherein said photosensor system detects the arrival of a document sheet edge at said registration position by sensing the transition in intensity of the reflected illumination from a spectral patch at said registration position versus the reflected illumination from a document sheet partially overlying said spectral patch at said registration position.

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**4,391,506**

## DRIVING METHOD AND APPARATUS FOR ILLUMINATION TYPE IMAGING SYSTEM

**Hiroshi Koide, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

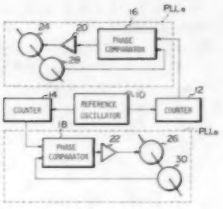
**Filed Nov. 23, 1981, Ser. No. 324,309**
**Claims priority, application Japan, Nov. 26, 1980, 55-166341**
**Int. Cl.³ G03G *15/00***
**U.S. Cl. 355—8** **9 Claims**

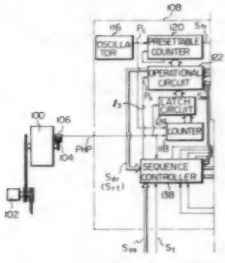
1. A method of driving a movable imaging system which is

driven by a first drive source in synchronism with a movable photoconductive member which is driven by a second drive source, said method comprising the steps of:

(a) measuring a time period necessary for the photoconductive member to move a given distance;

(b) comparing the measured time period with a predetermined reference time period to thereby estimate a fluctuation component in the time period of movement of the photoconductive member in accordance with a result of the comparison;




(c) presetting or determining a buildup target speed and a constant target speed during a buildup scanning speed motion and a constant scanning speed motion of the imaging system in accordance with the estimated fluctuation component respectively; and

(d) moving the imaging system at the preset buildup and constant target speeds during buildup and constant scanning speed motions thereof, respectively;

whereby the imaging system is moved in synchronism with the photoconductive member.

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**4,391,507**

## COPYING MACHINE CONTROL APPARATUS COMPRISING VARIABLE LENGTH PROGRAM CONTROL

**Goro Mori, and Masaaki Ogura, both of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Mar. 5, 1981, Ser. No. 240,658**

**Claims priority, application Japan, Mar. 13, 1980, 55-31764**

**Int. Cl.³ G03G *15/00***

**U.S. Cl. 355—14 R** **8 Claims**

1. A copying machine control apparatus comprising:

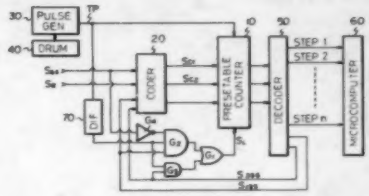
a moving photoconductive member;

pulse generator means for producing pulses in response to incremental movements of the photoconductive member;

presettable counter means for counting the pulses;

decoder means for producing set output signals in response to counts in the counter means;

coder means responsive to the set output signals produced by the decoder means constructed to apply a first output signal to the counter means when the count in the counter means has a first value and apply a second output signal to the counter means when the count in the counter means has a second value, said counter means being constructed to change its count from the first value to a third value in response to the first output signal and to change its count from the second value to a fourth value in response to the second output signal from the coder means;




the decoder means being further constructed to produce control output signals in response to predetermined counts in the counter means; and

copy operation control means for controlling an operation of the apparatus in response to the control output signals from the decoder means.

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**4,391,508**

## COUNTER AND TIMING MECHANISM FOR COPYING APPARATUS

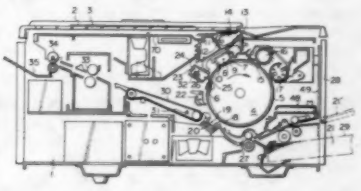
**Mitsuo Shibusawa, and Toshiyuki Ogawa, both of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Dec. 11, 1981, Ser. No. 329,980**

**Claims priority, application Japan, Dec. 18, 1980, 55-178083**

**Int. Cl.³ G03G *15/00***

**U.S. Cl. 355—14 CU** **6 Claims**



1. Electrophotographic copying apparatus comprising:

copy number input means for the desired number of copies of an original document;

first display means for indicating the set number;

second display means for indicating a copy ready condition in which the apparatus is ready to perform a copying operation;

copy starter means for commanding a start of the copying operation;

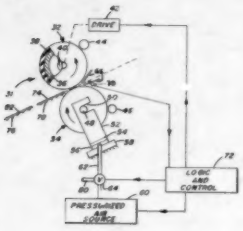
timer means for controlling the first display means to automatically return the set number of copies to one if the copy starter means fails to command the start of a copying operation during a predetermined period of time after the number of copies is set by the copy number input means; and

control means for controlling the copy number input means to permit the same to set the number of copies even during a period for which the apparatus stands ready to perform the copying operation.

## 4,391,509
## ROLLER FUSER APPARATUS IN WHICH COPY SHEET JAMS ARE MINIMIZED

William A. Cavagnaro, Fairport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 26, 1982, Ser. No. 362,438
Int. Cl.³ G03G *15/20*
U.S. Cl. 355—14 FU 7 Claims




7. Apparatus for fusing unfused toner images on copy sheets, comprising:

first and second rotatable fuser rollers;

drive means for rotating one of said rollers;

expandable bladder means for moving said second roller between (i) a first position out of engagement with said first roller, and (ii) a second position in engagement with said first roller to form a sheet engaging nip for fusing toner images on copy sheets advanced through said nip;

means for applying pressurized fluid to said bladder means to expand said bladder means and move said second roller from said first position to said second position;

means adjacent to said nip for detecting a copy sheet jam in said nip and for producing a signal when such jam is detected; and

means responsive to said signal for deflating said bladder means so as to move said second roller from said second position to said first position to prevent further driving of a jammed copy sheet in said nip, said deflating means including a vacuum source for accelerating the deflation of said bladder means.

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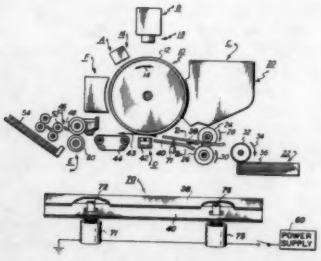
## 4,391,510
## VOICE COIL ACTUATOR REGISTRATION SYSTEM

Abraham Cherian, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jul. 30, 1980, Ser. No. 173,572
Int. Cl.³ G03G *15/14, 21/00*
U.S. Cl. 355—3 SH 4 Claims




1. In a high speed copier having a photoreceptor, an imaging system for forming images of documents on said photoreceptor, a predetermined paper path, and a feeder for forwarding sheets from a source into said paper path, the improvement comprising:

a pair of normally spaced apart members;

means for attracting magnetically said members toward one another so that said pair of members contact and advance the sheets therebetween along the path with precise control of the sheets;

dual registration means adapted to stop the sheets forwarded by said feeder thereby registering and deskewing the sheets, said dual registration means including immediate response voice coil actuators with plungers of said actuators acting as registration stops, said members and said dual registration means being actuated simultaneously based upon the location of images on said photoreceptor, said members serving to positively drive the sheets past the now retracted plungers in synchronism with the images on said photoreceptor.

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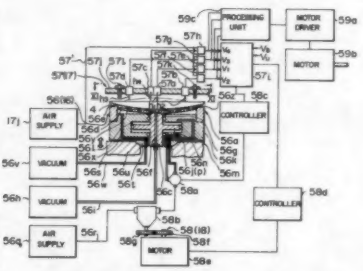
## 4,391,511
## LIGHT EXPOSURE DEVICE AND METHOD

Nobuyuki Akiyama; Yukio Kembo; Yasuo Nakagawa; Susumu Aiuchi, and Mineo Nomoto, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 18, 1981, Ser. No. 245,193
Claims priority, application Japan, Mar. 19, 1980, 55-33882; Aug. 11, 1980, 55-109275; Sep. 26, 1980, 55-132914; Oct. 23, 1980, 55-147539
Int. Cl.³ G03B *27/52*
U.S. Cl. 355—40 23 Claims




1. A device for exposing and printing a predetermined pattern on an exposure surface of a substrate, the device comprising:

measuring means for measuring a curvature of the exposed surface of said substrate,

a chuck including a suction and holding means having a deformable member for drawing and holding a back surface of said substrate opposite to said exposure surface of said substrate, and deforming means for imparting a force to said deformable member and said back surface of said substrate to deform said substrate,

control means for controlling said deforming means of said chuck in accordance with the curvature of said exposure surface of said substrate measured by said measuring means such that said exposure surface of said substrate conforms to an image surface of said pattern over an entire exposure area within a predetermined allowable error, and

means for carrying and transporting said chuck in a substantially horizontal direction from a substrate deformation correcting station to an exposure station.

## 4,391,512
## DEVELOPING DEVICE USING MAGNETIC DEVELOPER

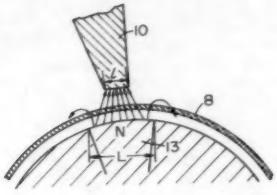
**Shunji Nakamura, Kawasaki, and Kozo Arao, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 28, 1979, Ser. No. 108,058**

**Claims priority, application Japan, Jan. 6, 1979, 54-890; Jan. 9, 1979, 54-1634**

**Int. Cl.³ G03G *15/09***

**U.S. Cl. 355—3 DD** **9 Claims**




1. A developing device for forming a developed image on an image bearing member, comprising in combination:
   (a) developer holding means having a developer holding surface adapted to oppose the image bearing member;
   (b) means for supplying magnetic developer onto said developer holding surface;
   (c) fixed magnetic field generating means disposed on the side of said developer holding means opposite to said developer holding surface; and
   (d) magnetic thickness regulating means disposed on the opposite side of said developer holding means from said magnetic field generating means and within the influence of the magnetic field of a magnetic pole of said magnetic field generating means, said magnetic thickness regulating means being provided with a tip facing said developer holding surface and having a width which is smaller than the width of said magnetic pole of said magnetic field generating means, said magnetic thickness regulating means being opposed to said magnetic pole of said magnetic field generating means across said developer holding means to concentrate the magnetic lines of force extending from said magnetic pole and thereby regulate the developer layer to a thickness smaller than the gap between said magnetic thickness regulating means and said developer holding means.

## 4,391,513
## RANGE FINDING OPTICAL MECHANISM

**Makoto Fujiki, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

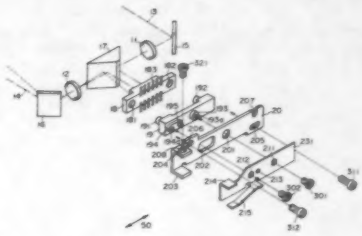
**Filed Dec. 18, 1980, Ser. No. 217,823**

**Claims priority, application Japan, Dec. 25, 1979, 54-179517[U]; Dec. 25, 1979, 54-179518[U]; Dec. 25, 1979, 54-179519[U]**

**Int. Cl.³ G01C *3/10*; G03B *7/08***

**U.S. Cl. 356—1** **6 Claims**

1. A range finding optical mechanism including:
   (a) a pair of fixed range finding optical systems each having an entrance window for introducing therethrough the light from the subject of range finding, said entrance windows being spaced a predetermined distance from each other, said range finding optical systems being adapted to form object images separately on a predetermined imaging plane, the spacing between said formed images being variable in accordance with the distance from said optical systems to the subject;
   (b) photoelectric converter means including a plurality of photosensitive elements arranged in the form of a row on said imaging plane, said photosensitive elements comprising two sections which together define said row, each of said sections corresponding to one of said pair of range finding optical systems, each of said optical systems being arranged to form an image of the subject on one of said two sections and said photoelectric converter means generating electrical signals corresponding to the illumination distributions of the images so formed; and
   (c) a regulating device for said photoelectric converter means, said regulating device including first regulating means for displacing said photoelectric converter means in a plane generally perpendicular to the optical axes of said pair of range finding optical systems and in a direction parallel to a line passing through the optical axes of said pair of range finding optical systems, and second regulating means for rotatively displacing said photoelectric converter means in a plane perpendicular to the optical axes of said pair of range finding optical systems and about a pivot axis substantially coincident with the center of the area of one said section of said photosensitive elements of said photoelectric converter means on which the image of the subject is formed by one of said range finding optical systems.



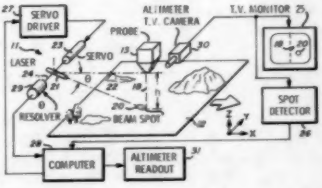
## 4,391,514
## SIDELOOKING LASER ALTIMETER FOR A FLIGHT SIMULATOR

**Larry D. Webster, San Jose, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Feb. 13, 1981, Ser. No. 234,224**

**Int. Cl.³ G01C *3/10*; G09B *9/08***

**U.S. Cl. 356—1** **11 Claims**




1. In a method for determining the altitude of a flight simulator probe moving relative to and above the terrain of a flight simulator model wherein the imaginary line extending from the probe in a direction normal to the model is characterized as the probe plumb line, the steps of:
   directing a pencil-like beam of radiation from said probe onto the model keeping said beam within a plane containing said probe plumb line to produce a beam spot on said model;
   detecting the location of said beam spot relative to two orthogonal coordinates with a detector situated remote from said probe plumb line and having a linear sensitivity zone optically aligned with said probe plumb line;
   varying the angular orientation of the beam within said

probe plumb line plane and relative to a reference plane so as to cause said beam spot to impinge on the model site intersected by said probe plumb line;

determining the angular orientation of the beam relative to said reference plane; and

utilizing the determined angular orientation of said beam to determine the altitude of said probe over the terrain of the model.

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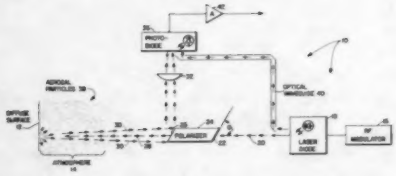
**4,391,515**

## OPTICAL TRANSMITTER/RECEIVER APPARATUS SHARING COMMON OPTICS

**Howard M. Forrester, Ridgecrest, and John R. Crisler, China Lake, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed May 7, 1981, Ser. No. 261,341**
**Int. Cl.³ G01C *3/08***
**U.S. Cl. 356—5** **1 Claim**




1. Optical detection apparatus comprising:

means for generating a beam of coherent light;

a discrete optical polarizing component including a plurality of wedge shaped light transmissive plates arranged in two groups each group being arranged in a spaced apart stack,

one surface of one of said wedge shaped plates from one of said groups being positioned to intercept the light from said coherent light generating means at a predetermined angle of incidence,

another surface of another of said wedge shaped plates being arranged to receive incoming light reflected from an object in an ambiant environment having particular polarization characteristics;

a light detection element;

a lens positioned between said discrete optical component upon said light detection element; and

means for transmitting light from said coherent light generating means to said light detecting element, whereby it is mixed with the coherent light from said discrete optical component to produce a data signal.

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**4,391,516**

## METHOD OF DETERMINING AN INDEX OF REFRACTION PROFILE OF AN OPTICAL FIBER

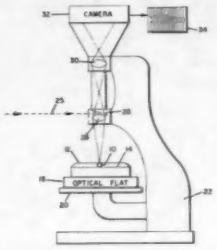
**Luther M. Boggs, Dunwoody, and William B. Gardner, Chamblee, both of Ga., assignors to Western Electric Co., Inc., New York, N.Y. and Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Sep. 11, 1978, Ser. No. 941,824**
**Int. Cl.³ G01N *21/45***
**U.S. Cl. 356—73.1** **7 Claims**

1. The method of determinig an index of refraction profile of the core of an optical fiber having a substantially cylindrical core encased within a surrounding cladding comprising the steps of:

(a) forming an interferogram with a beam of radiant energy passing transversely through the optical fiber with the interferogram having a pattern of mutually spaced interference fringe lines shifted from a reference line distances determined by differences between indices of refraction radially through the fiber core and that of the fiber cladding;

(b) measuring the interferogram fringe line shift at a plurality of points along a fringe line corresponding to a series of mutually parallel ray chord paths extending through the core at mutually diverse minimum radial distances from the core axis; and




(c) sequentially calculating from core peripheral region inwardly towards the core center that portion of the measured fringe line shift attributable to discrete differences in indices of refraction of cylindrical core ring portions of thicknesses defined by successive minimum radial distances in the series of ray paths and that of the cladding.

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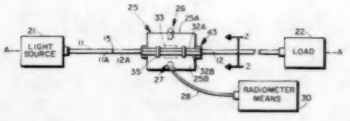
**4,391,517**

## METHOD OF MEASURING SPLICE LOSS IN OPTICAL FIBERS

**Joseph Zucker, Foster City, and Arthur H. Fitch, Redwood City, both of Calif., assignors to GTE Automatic Electric Laboratories, Inc., Northlake, Ill.**

**Continuation-in-part of Ser. No. 205,844, Nov. 10, 1980, Pat. No. 4,360,268. This application Apr. 27, 1981, Ser. No. 257,697**
**The portion of the term of this patent subsequent to Nov. 23, 1999, has been disclaimed.**
**Int. Cl.³ G01N *21/84***
**U.S. Cl. 356—73.1** **13 Claims**




1. The method of measuring the insertion loss of a splice between adjacent one ends of first and second optical fibers comprising the steps of

transmitting reference light in the first fiber;

producing a first measurement $P_O$ of the radiant power of the light in the first fiber,

producing a second measurement $P_R$ of the radiant power of only light radiated generally transversely out of the circumference of only the second fiber in a significant portion of the length thereof that is downstream of the splice and exhibiting substantial leaky mode radiation as a result of the occurrence of the splice, for reference light of the radiant power $P_O$ in the first fiber and incident on the splice, and

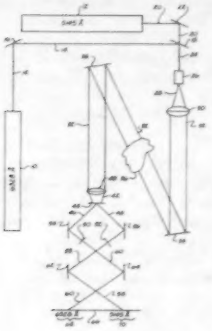
producing an indication of the splice loss from the ratio of the two measurements.

**4,391,518**

## DUAL LASER OPTICAL SYSTEM AND METHOD FOR STUDYING FLUID FLOW

**Robert B. Owen, and William K. Witherow, both of Huntsville, Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.**

**Filed Jan. 12, 1981, Ser. No. 224,232**
**Int. Cl.³ G01N *21/41***
**U.S. Cl. 356—129** **6 Claims**



1. A method of producing and visualizing simultaneous images of perpendicular components of refractive index gradients in transparent substances comprising the steps of:

providing two laser beams, each said beam having a different wave length;

combining and collimating said two laser beams into a single beam containing said two different wave length components;

providing a test volume which includes said transparent substance;

passing said collimated beam through said test volume;

separating said collimated beam into two separate beams having said different wave lengths;

providing two separate knife edges arranged mutually perpendicular to one another;

focusing a first of said separated beams on one of said knife edges and a second of said beams on the other of said knife edges;

projecting light allowed to be passed by said knife edges onto a viewing means; and

producing visual images of mutually perpendicular refractive index gradients passed by said knife edges on said viewing means for simultaneous viewing.

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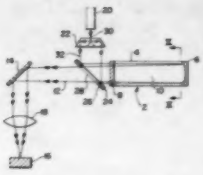
**4,391,519**

## AXIS-MONITORING APPARATUS FOR A LASER BEAM

**Kouji Kuwabara; Hiroyuki Sugawara, both of Hitachi; Toshiharu Shirakura, Tokai; Kouji Sasaki, and Satoshi Takemori, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Sep. 12, 1980, Ser. No. 186,731**
**Claims priority, application Japan, Sep. 12, 1979, 54-116195**
**Int. Cl.³ G01B *11/27***
**U.S. Cl. 356—153** **11 Claims**

1. A laser beam axis-monitoring apparatus, the apparatus comprising a laser oscillating means for generating a laser beam, and a light generator means for generating a light for monitoring an axis of the laser beam, characterized in that directing means are arranged between the laser oscillator means and the light generator means for directing the light from the generator means into the laser oscillator means, said directing means includes a ring-shaped mirror having an opening at a center thereof, and concave mirror means are disposed in the laser oscillator means for reflecting the light from the ring-shaped mirror out of the laser oscillator means in such a manner that the axis of the laser beam and axis of the light are



coincident with both the light and said laser beam from said laser oscillator means passing through said opening of said ring-shaped mirror.

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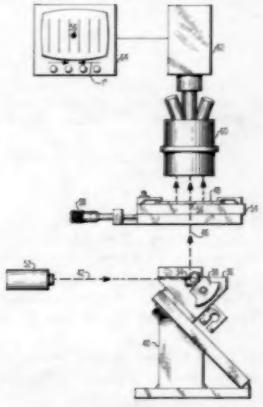
**4,391,520**

## TECHNIQUE FOR OPTICAL ALIGNMENT OF A WORKPIECE

**Douglas H. Ziegel, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.**

**Filed Sep. 22, 1980, Ser. No. 189,350**
**Int. Cl.³ G01B *11/26***
**U.S. Cl. 356—154** **21 Claims**



1. A method of aligning a surface of a workpiece with respect to a positioning ring attached to a holder supporting said workpiece, said holder adapted to rotate said surface, with respect to said positioning ring, about a first axis, comprising the steps of:

mounting said holder on an alignment platform adjacent a positioning block attached thereto for holding said positioning ring in a predetermined position, said alignment platform being supported by a table,

exposing said surface to an incident light beam, whereby said incident beam is reflected from said surface, as a reflected beam, onto a screen along a path of alignment marks disposed thereon,

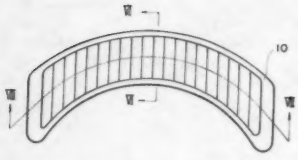
revolving said positioning block, with respect to said alignment platform, about said first axis, whereby the point on said surface where said beam strikes remains substantially fixed in space, and

rotating said surface about said first axis to change the location where said reflected beam strikes said screen, whereby said surface is properly aligned with respect to said positioning ring when said reflected beam strikes a particular location on said screen.

## 4,391,521
## PHOTOMETER HAVING ASYMMETRICAL APERTURE AND WITH COMPENSATION FOR DIRECTION OF INCIDENCE

**Toshihiro Imai, Hachioji, and Toyotaka Yamada, Hino, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan**

**Filed Sep. 17, 1980, Ser. No. 188,146**
**Claims priority, application Japan, Sep. 18, 1979, 54-119832**
**Int. Cl.³ G01J *1/04***
**U.S. Cl. 356—225** **6 Claims**




1. A photometer comprising a photodetector, a mask having asymmetrical apertures and arranged before said photodetector, and a compensation prism arranged in the path of the light to be incident on said photodetector to compensate for the asymmetry of the light pencil which passes through said mask and is incident on said photodetector.

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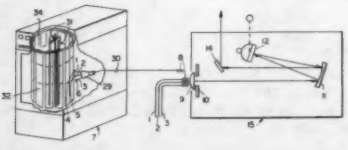
## 4,391,522
## TEST APPARATUS FOR DETERMINING RESISTANCE TO LIGHT AND WEATHER INFLUENCES

**Helmut Schmid, Krefeld; Martin Bock, Duisburg, and Günther Kämpf, Krefeld, all of Fed. Rep. of Germany, assignors to Original Hanau Heraeus GmbH, Hanau, Fed. Rep. of Germany**

**Filed Oct. 3, 1980, Ser. No. 193,465**
**Claims priority, application Fed. Rep. of Germany, Oct. 4, 1979, 2940325**
**Int. Cl.³ G01N *17/00*; G01J *3/38***
**U.S. Cl. 356—326** **5 Claims**




1. Apparatus for determining resistance to light and weather influences of sample surfaces, said apparatus including, in combination, with at least one source of light disposed for irradiation of said sample surfaces:

fastening means **(34)** for fastening at least one sample for a period of time during which radiation from said source is incident on at least a portion of the surface of said sample,

radiation measuring means **(15)** comprising radiation detection means **(14)** and radiation indicating means **(24; 27,28)**, and

light guiding means **(1, 2, 3; 29; 8; 9)**, having a plurality of input terminals, each in the vicinity of one of said fastening means **(34)**, for guiding a portion of the radiation of said at least one light source from said input terminals to said radiation measuring means **(15)**, said input terminals being disposed for receiving radiation from said at least one light source comparable with the radiation incident on portions of said at least one sample respectively adjacent to said input terminals,

wherein, in accordance with the invention, said radiation measuring means **(15)** comprises,

means **(12)** for producing a spectral dispersion of radiation received from said light guiding means and thereby making spectrally dispersed radiation incident on said radiation detection means **(14)**, and

means **(16)** for adjusting said radiation detection means so as to selectively detect radiation in at least one of a plurality of spectral regions.

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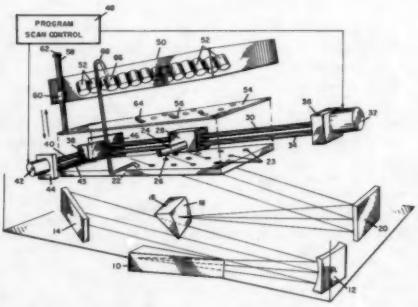
## 4,391,523
## SCANNABLE DETECTOR SYSTEM FOR ECHELLE GRATING SPECTROMETERS

**Karl J. Hildebrand, Tyngsboro, and John Leeman, Andover, both of Mass., assignors to Leeman Labs Inc., Tewksbury, Mass.**

**Continuation-in-part of Ser. No. 206,445, Nov. 13, 1980, abandoned. This application Mar. 23, 1981, Ser. No. 246,716**
**Int. Cl.³ G01J *3/34, 3/38***
**U.S. Cl. 356—328** **4 Claims**




1. A scannable detector system for echelle grating spectrometric comprising in combination:

a. an echelle diffraction grating for separating radiation input energy into a spectrum of mixed orders;

b. optical dispersing means for further separating said orders into a spectral array of discrete monochromatic wavelength segments;

c. imaging means to image said spectral array in a focal plane;

d. a first aperture plate positioned in said focal plane, said plate having a plurality of apertures corresponding to focal positions of said segments of said array;

e. at least one scannable photodetector positioned behind said plate to receive and sense any of said wavelength segments transmitted by said plate;

f. means to scan said detector from aperture to aperture to measure individual wavelength segments in a selected sequence;

g. a photodetector array mounted behind said first aperture plate;

h. means to remove said scannable detector from the field of said plate;

i. a second masking aperture plate having fewer apertures than said first aperture plate; and

j. mounting means for mounting said second aperture plate between said photodetector array and said first aperture plate, said mounting means arranged such that said aper-

tures in said second plate align with said apertures in said first plate.

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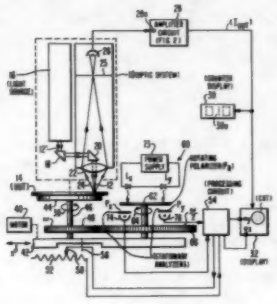
**4,391,524**

## METHOD FOR DETERMINING THE QUALITY OF LIGHT SCATTERING MATERIAL

**Edgar F. Steigmeier, Hedingen, and Heinrich Auderset, Horgen, both of Switzerland, assignors to RCA Corporation, New York, N.Y.**

**Filed Mar. 16, 1981, Ser. No. 244,060**
**Int. Cl.³ G01N *21/01***
**U.S. Cl. 356—338** **12 Claims**



1. The method for determining the quality of a material having a property of absorbing light to a given penetration depth comprising the steps of:

(a) exposing one or more regions of said material to a beam of light of a selected wavelength;

(b) detecting scattered light having an intensity greater than a threshold intensity from the exposed material to provide an electrical signal proportional to the intensity of detected scattered light above said threshold intensity;

(c) applying the electrical signal to a visual display device to control the intensity of a display beam of the device; and

(d) varying said threshold intensity to thereby vary the intensity of the display beam so as to provide the minimum intensity of display beam which yields a full display of the exposed material, wherein the value of the threshold intensity is a direct measure of the crystalline quality of the material.

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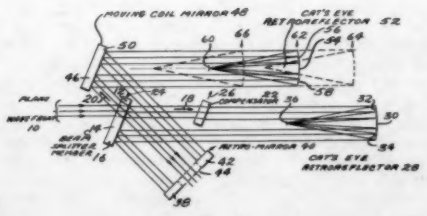
**4,391,525**

## INTERFEROMETER

**Robert A. Woodruff, Goleta, Calif., assignor to Ball Corporation, Muncie, Ind.**

**Filed Oct. 10, 1979, Ser. No. 83,315**
**Int. Cl.³ G01B *9/02*; G02B *27/10***
**U.S. Cl. 356—346** **31 Claims**



1. An interferometer comprising:

a beamsplitter member including a surface;

a beamsplitting coating disposed on a first portion of said beamsplitter member surface for splitting incident light into a transmitted beam and a reflected beam, said transmitted beam propagating along a first optical path of said interferometer and said reflected beam propagating along a second optical path of said interferometer;

a compensator positioned in said first optical path;

a first reflector for reflecting light transmitted by said beamsplitter;

a second reflector formed by a coating positioned upon a second portion of said surface of said beamsplitter member, such that said second reflector and said beamsplitting coating are substantially coplanar, said second reflector for reflecting light from said first reflector;

a retro-reflector for reflecting light transmitted thereto from said second reflector back toward said second reflector, said light retracing its optical path back to said beamsplitter;

a third reflector for reflecting light reflected by said beamsplitter;

a fourth reflector for reflecting light reflected by said third reflector back to said third reflector and then to said retroreflector, said retroreflector reflecting light back toward said third reflector, said light retracing its optical path back to said beamsplitting coating along said second optical path, said transmitted beam and said reflected beam being recombined at said beamsplitting coating.

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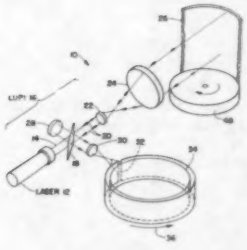
**4,391,526**

## INTERFEROMETRIC SURFACE CONTOUR MEASURING ARRANGEMENT

**Joseph L. McLaughlin, Marblehead, Mass., assignor to Itek Corporation, Lexington, Mass.**

**Filed Aug. 24, 1981, Ser. No. 295,426**
**Int. Cl.³ G01B *11/24***
**U.S. Cl. 356—359** **23 Claims**



1. A method of interferometrically measuring the contour of a reflective surface, comprising the steps of:

a. projecting a light wave onto the reflective surface such that a wave is reflected therefrom;

b. interfering the reflected wave with a reference wave to form a resultant interference pattern;

c. projecting a portion of the resultant interference pattern onto a recording medium;

d. scanning the reflective surface with the projected wave by relatively moving the projected wave relative to the reflective surface; and

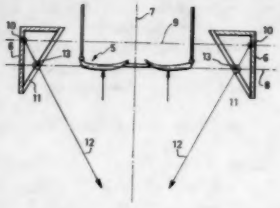
e. moving the projected interference pattern relative to the recording medium synchronously with the scanning of the reflective surface, whereby the information recorded on the recording medium is a development of the contour of the reflective surface.

4,391,527

## PROCESS AND DEVICE FOR THE POSITIONING OF AN OPTICAL MEASURING INSTRUMENT AND A SPECTACLE FRAME IN RELATION TO EACH OTHER

Jean-Claude Hennequin, Neuilly, France, assignor to Essilor International, Neuilly, France

Filed Jan. 14, 1981, Ser. No. 225,035
Claims priority, application France, Jan. 23, 1980, 80 01428
Int. Cl.³ G01B 11/14; A61B 3/00
U.S. Cl. 356—375 11 Claims



1. A process for positioning an optical measuring instrument comprising a positioning device and a spectacle frame in relation to each other, wherein two positioning marks on the device are arranged in such a way as to define a reference plane, and that the positioning device and spectacle frame are moved into a position in which the reference plane and mean plane of the frame are in a given position in relation to each other, and by the fact that a semi-transparent mirror is placed between the frame and each of the positioning marks, each such mirror, separated from the other mirror, being placed symmetrically in relation to a median plane of symmetry at right angles to the reference plane, and forming a plane bisecting the angle formed by the mirrors, and by the fact that the positioning marks are observed from a point on this bisecting plane, and that the device and frame are moved in relation to each other until the reflection of the side outline of the frame in each of the mirrors coincides with the relevant positioning mark visible through each mirror.

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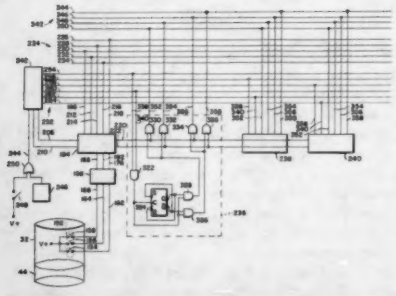
4,391,528

## SILO SYSTEM FOR MIXING STORED MATERIAL

Heinrich Klein-Albenhausen, Hamburg, Fed. Rep. of Germany, assignor to Ibau Hamburg Ingenieurgisillschaft Endustreibau mbH, Hamburg, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 811,618, Jun. 30, 1977. This application Sep. 25, 1980, Ser. No. 190,662
Int. Cl.³ B28C 5/00, 7/04
U.S. Cl. 366—15 34 Claims



1. A silo system for mixing stored material, comprising:
a mixing silo having a plurality of discharge apertures;
a receptacle;
conduit means for conveying material from the discharge apertures to the receptacle;
a plurality of valve means for controlling material flow, each of the valve means controlling material flow through a corresponding one of the discharge apertures;
level sensor means for generating level sensor signals indicative of the material level in the receptacle; and
first means responsive to the level sensor signals for temporarily opening valve means in a predetermined sequence when the material level in the receptacle is rising to a first predetermined point and thereafter keeping all of the valve means closed until the material level in the receptacle falls to a second predetermined point below the first predetermined point, said first means additionally comprising means for reducing the rate of flow through temporarily opened valve means when the material level in the receptacle rises to a third predetermined point between the first and second predetermined points.

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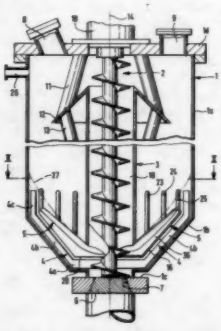
4,391,529

## APPARATUS FOR MIXING AND DEGASSING COMPONENTS OF SYNTHETIC RESINS, PARTICULARLY THERMO-SETTING SYNTHETIC RESINS

Wilhelm Hedrich, Ehringshausen; Heinz Krumm, Sinn, and Erhard Haeuser, Schoeffengrund, all of Fed. Rep. of Germany, assignors to Wilhelm Hedrich Vakuumanlagen GmbH & Co. KG, Ehringshausen, Fed. Rep. of Germany

Filed Jul. 8, 1981, Ser. No. 281,524
Claims priority, application Fed. Rep. of Germany, Jul. 12, 1980, 3026492
Int. Cl.³ B01F 5/12
U.S. Cl. 366—266 13 Claims



1. In an apparatus for mixing and degassing components of synthetic resins, comprising an evacuatable, chamber means having a top wall, a cylindrical wall structure and a downwardly and inwardly tapered conical wall structure and a bottom wall structure at the lower end thereof, means defining an opening into said chamber means for facilitating an evacuation of said chamber means, a rotatable worm conveyor centrally arranged in said chamber means and closely surrounded by an elongated vertically upstanding guide tube, the ends of which are spaced from the top and bottom walls of said chamber means, securement means for fixedly securing said guide tube to said chamber means, said guide tube having at its top end a discharge plate, and including between the lower end of said guide tube and said conical wall structure of said container at least one radially extending agitating arm secured to said worm conveyor at the lower end thereof, the improvement comprising wherein at least one collecting arm is secured to and projects radially from said guide tube, said collecting arm extending above said agitating arm, is spaced a small distance from said wall structures of said chamber means, and has means defining a collecting opening which faces in a direction

opposite the direction of rotation of said agitating arm, and means defining an opening connecting an interior cavity in said collecting arm to the interior of said guide tube.

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## 4,391,530
## ELECTRONIC TIMEPIECE

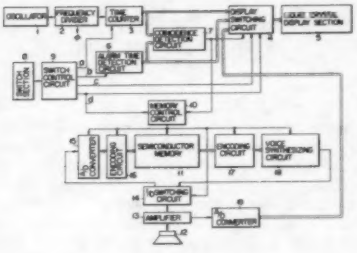
**Takuo Wakabayashi, deceased, late of Saitama, Japan; by Shigemasa Wakabayashi, legal representative, Nagano, Japan; Iwao Tahara, Higashiyamato, Japan; Toshiharu Aihara, Kodaira, Japan; Naoki Takahashi, Fussa, Japan, and Yushin Matsuo, Chofu, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Filed Sep. 18, 1980, Ser. No. 188,515**

**Claims priority, application Japan, Sep. 27, 1979, 54-126264; Dec. 6, 1979, 54-158983; Dec. 6, 1979, 54-158986; Dec. 11, 1979, 54-161292; Dec. 11, 1979, 54-161293; Dec. 11, 1979, 54-161294; Dec. 12, 1979, 54-161813**

**Int. Cl.³ G04B *21/08*; G11C *13/00***

**U.S. Cl. 368—63** **18 Claims**




1. An electronic timepiece comprising:

time counter means for counting a reference frequency signal to form time data;

time display means coupled to said time counter means for displaying said time data;

first converting means for converting an externally provided voice sound into voice data;

a semiconductor memory coupled to said first converting means for storing said voice data;

address assigning means coupled to said semiconductor memory for sequentially assigning addresses of said semiconductor memory;

second converting means coupled to said semiconductor memory for converting said voice data stored in said semiconductor memory into a voice signal;

voice reproducing means coupled to said second converting means for generating a voice sound in accordance with said voice signal;

externally operable switch means for enabling said semiconductor memory to store said voice data;

voice data writing instructing means coupled to said externally operable switch means and to said address assigning means for supplying a writing instruction signal, generated by operating said externally operable switch means, to said address assigning means and to said first converting means to enable storing of said voice data from said first converting means in said semiconductor memory;

alarm signal generating means coupled to said time counter means for generating an alarm signal when said time data coincides with a predetermined alarm time; and

voice readout control means coupled to said alarm signal generating means for supplying said alarm signal as a readout instruction signal to said address assigning means and to said second converting means to enable said second converting means to convert said voice data stored in said semiconductor memory into said voice signal so that said voice reproducing means generates a voice sound corresponding to said voice signal.

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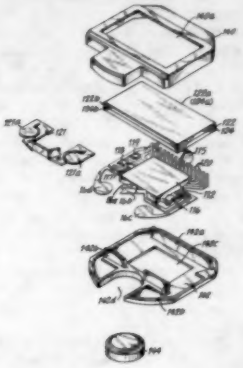
## 4,391,531
## ELECTROOPTICAL DISPLAY/LEAD FRAME SUBASSEMBLY AND TIMEPIECE MODULE INCLUDING SAME

**Dick Yokota, Los Gatos; David Kuty, Felton, and Malcolm Kinter, Sunnyvale, all of Calif., assignors to Timex Corporation, Waterbury, Conn.**

**Filed Dec. 19, 1980, Ser. No. 218,136**

**Int. Cl.³ H05K *5/06***

**U.S. Cl. 368—239** **28 Claims**



1. A subassembly for an electronic display device, comprising:

a. a conductive lead frame carrying an integrated circuit chip and having a plurality of spaced conductor members each with an inner end connected electrically to said chip and each with an outer end formed into a resilient contact finger, the contact fingers being arranged in a preselected pattern to define an enclosure, and

b. an electrooptical display having longitudinal edges positioned within said enclosure, said display having display electrodes and a plurality of contact terminals connected to said electrodes and spaced along its edges in such a pattern that each resilient contact finger of the lead frame frictionally engages a respective one of the contact terminals when the display is positioned in said enclosure, thereby establishing electrical connection therebetween and releasably holding the display between said contact fingers.

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## 4,391,532
## ELECTROMAGNETIC ACOUSTIC TRANSDUCER

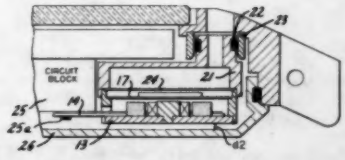
**Yoshiaki Hara, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Tokyo, Japan**

**Filed Apr. 21, 1981, Ser. No. 256,161**

**Claims priority, application Japan, Apr. 22, 1980, 55-53189**

**Int. Cl.³ G04C *21/16***

**U.S. Cl. 368—250** **11 Claims**




1. In an alarm electronic wristwatch having a watchcase: an electromagnetic acoustic transducer comprising a base plate having an upper surface and an undersurface and having a

plurality of upstanding projections projecting upwardly from the upper surface, a magnetic core, an excitation coil surrounding the magnetic core, a set of permanent magnets, the core, coil and permanent magnets all being supported by the base plate, a vibratory plate mounted in spaced relation from the magnetic core to undergo vibration in response to the application of a drive signal to the excitation coil, a support frame of generally circular shape extending around the base plate and having an opening therethrough, a lead substrate comprised of flexible material mounted on the upper surface of the base plate and having a lead substrate extension projecting through the support frame opening and having a plurality of openings receiving therein respective ones of the base plate projections, the base plate projections cooperating with the lead substrate openings to position the lead substrate on the base plate at a predetermined position, an electrode pattern on the lead substrate, and means electrically connecting at least one of the terminals of the excitation coil to the electrode pattern for applying drive signals to the excitation coil; means mounting the electromagnetic acoustic transducer within the watchcase with the undersurface of the base plate disposed opposite an inner surface of the watchcase; and a circuit block connected to the lead substrate extension projecting through the opening of the support frame for generating drive signals at preselected alarm times and applying the drive signals to the electrode pattern to thereby activate the transducer.

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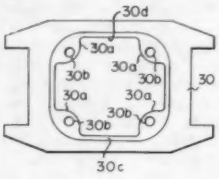
**4,391,533**

## BACK COVER FIXING STRUCTURE FOR WRISTWATCH

**Masahiko Waki, Tanashi, Japan, assignor to Citizen Watch Co. Ltd., Tokyo, Japan**

**Filed Feb. 16, 1982, Ser. No. 349,167**
**Claims priority, application Japan, Feb. 17, 1981, 56-21049**
**Int. Cl.³ G04B *37/00***
**U.S. Cl. 368—281** **5 Claims**




1. A back cover fixing structure for a wristwatch comprising:

a case band having an inner wall and an outer wall and having a plurality of projecting portions on said inner wall, in which said projecting portions project inwardly toward a center of said case band, each of said inwardly projecting portions having a screw hole;

a back cover having a plurality of throughholes provided at positions corresponding to the screw holes of said inwardly projecting portions; and

a plurality of screws set in the screw holes of said inwardly projecting portions through the throughholes of said back cover for fixing said back cover to said case band.

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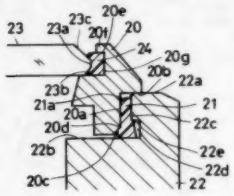
**4,391,534**

## GLASS MOUNTING STRUCTURE FOR WATCHES

**Osamu Matsumura, and Masataka Matsumoto, both of Tanashi, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 114,743, Jan. 24, 1980. This application Aug. 4, 1981, Ser. No. 289,840**
**Claims priority, application Japan, Jan. 27, 1979, 54-9027[U]**
**Int. Cl.³ G04B *39/02***
**U.S. Cl. 368—294** **7 Claims**

1. A glass mounting structure comprising a watch case, a bezel, a glass having beveled portions at upper and lower edges thereof, a first packing disposed between said watch case and bezel, and a second packing disposed between said bezel and glass, said watch case having an upper receiving portion, an axially extending inside engaging portion, an annular groove provided in a lower portion of said axially extending inside engaging portion, and a lower receiving portion laterally extending from a lower portion of said annular groove, said bezel having a peripheral engaging portion for engaging said first packing, a lower portion opposite said annular groove, a beveled guiding portion at the lower end of said peripheral engaging portion which is positioned lower than the upper edge of said annular groove, an underside portion laterally extending from the upper end of said engaging portion which overlaps and contacts said upper receiving portion of said watch case,




and an inside annular groove for receiving said second packing, the upper boundary of said annular groove for receiving said second packing being spaced from said glass at all times so as not to contact the upper edge beveled portion, the lower boundary of said annular groove for said second packing being extended to the underside of said glass, said bezel being inserted from the upper edge of said first packing thereinto, so that a lower portion of said first packing is expanded into said annular groove of the watch case, whereby when said bezel is removed from said watch case, said first packing is held in said watch case, said glass being downwardly inserted into the second packing, so that a periphery of the glass dents in said second packing and that the upper portion of said second packing presses down on the beveled portion of said upper edge.

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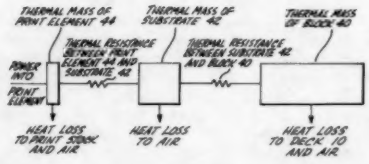
**4,391,535**

## METHOD AND APPARATUS FOR CONTROLLING THE AREA OF A THERMAL PRINT MEDIUM THAT IS EXPOSED BY A THERMAL PRINTER

**Roger C. Palmer, Edmonds, Wash., assignor to Intermec Corporation, Lynnwood, Wash.**

**Filed Aug. 10, 1981, Ser. No. 291,625**
**Int. Cl.³ B41J *3/20***
**U.S. Cl. 400—120** **10 Claims**


THERMAL MASS OF PRINT ELEMENT 44
THERMAL MASS OF SUBSTRATE 42
THERMAL MASS OF BLOCK 40
THERMAL RESISTANCE BETWEEN PRINT ELEMENT 44 AND SUBSTRATE 42
THERMAL RESISTANCE BETWEEN SUBSTRATE 42 AND BLOCK 40
POWER INTO PRINT ELEMENT
HEAT LOSS TO PRINT STOCK AND AIR
HEAT LOSS TO AIR
HEAT LOSS TO BLOCK 10 AND AIR

1. An apparatus for controlling the area of a thermal print medium that is exposed by a thermal printer, the thermal print medium being such that any portion thereof is exposed when its temperature equals or exceeds a predetermined threshold temperature, the thermal printer including an electrically-resistive thermal print element having a surface that is in good thermal contact with the thermal print medium and that has an area equal to the desired exposure area of the thermal print

medium, the thermal printer further including driver means for applying an electrical signal having a substantially constant amplitude to the thermal print element, said apparatus comprising:

electrical energy storage means representing the thermal mass of the thermal print element, said electrical energy storage means being adapted to provide a first signal whose amplitude is proportional to the instantaneous amount of electrical energy stored in said electrical energy storage means;

first means for transferring electrical energy into said electrical energy storage means at a rate proportional to the power being supplied to the thermal print element by the application of said substantially constant amplitude electrical signal thereto;

second means transferring electrical energy to and from said electrical energy storage means in relation to the heat transferred between the thermal print element and the environment in heat transfer relationship with the thermal print element, whereby the amplitude of said first signal is proportional to the instantaneous temperature of the thermal print element;

third means providing a second signal whose amplitude is related to the threshold temperature of the thermal print medium; and,

fourth means concurrently enabling the driver means of the thermal printer and said first means, and concurrently disabling the driver means of the thermal printer and said first means whenever the amplitude of said first signal exceeds that of said second signal.

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## 4,391,536
## WORD PROCESSOR PRINT WHEEL ASSEMBLY

**Michael Müller, Wädenswil; Herbert Scherrer, Uster, and Erwin Kägi, Volketswil, all of Switzerland, assignors to Franz Buttner AG, Zurich, Switzerland**

**Filed Sep. 1, 1981, Ser. No. 298,307**

**Claims priority, application Switzerland, Sep. 2, 1980, 6608/80**

**Int. Cl.³ B41J *1/30, 27/04***

**U.S. Cl. 400—144.2** **10 Claims**

1. A print wheel assembly for a printer of a word processing machine or the like, comprising:

a type disk formed unitarily with a hub and a peripheral array of laterally deflectible typefaces connected to said hub;

an annular color-transfer layer connected to said disk and overlying said typefaces for juxtaposition with a paper onto which images of said typefaces are to be transferred by impact, said transfer layer being provided on a carrier rotatably mounted on said hub and angularly shiftable relative to said disk upon rotation thereof to offset successive points of contact between said typefaces and the layer; and

an annular reservoir on said carrier and rotatably mounted thereby on said disk containing flowable coloring material and connected to said layer for transferring said material to said layer, said reservoir containing a porous material impregnated with said coloring material.

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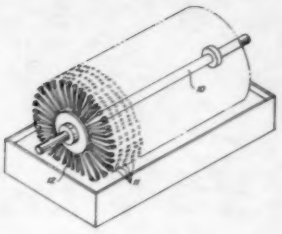
## 4,391,537
## SELECTIVELY ALTERING THE BULK PROPERTIES OF POLYMER STRUCTURES

**William M. Prest, Jr., and Frederick J. Roberts, Jr., both of Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 3, 1981, Ser. No. 327,147**

**Int. Cl.³ B41J *1/30*; B05D *3/06***

**U.S. Cl. 400—144.2** **18 Claims**



1. A method for selectively hardening and toughening the bulk mass of the character fonts on a polymeric print wheel without adversely affecting the flexibility and strength of the remaining portions of the print wheel which comprises contacting the character fonts of the print wheel with a multifunctional monomer for a time sufficient to diffuse said monomer into said fonts and irradiating the character fonts with activating radiation to cause the bulk of the fonts to be hardened and toughened.

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## 4,391,538
## SERIAL PRINTER

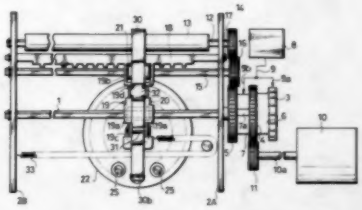
**Hiroshi Miyano, Yokohama, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan**

**Filed Jul. 20, 1981, Ser. No. 285,299**

**Claims priority, application Japan, Jul. 22, 1980, 55-100409**

**Int. Cl.³ B41J *1/30***

**U.S. Cl. 400—145.1** **12 Claims**



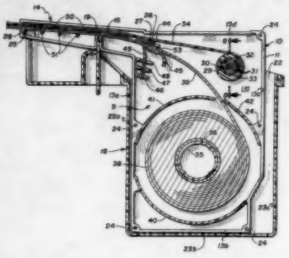
1. A type wheel for a serial printer including a disc-shaped member having a plurality of apertures spaced circumferentially around the outer portion thereof, a plurality of dome members each covering a respective aperture and formed of a resilient material enabling each dome member to be deflected inwardly toward the respective aperture by a snap action substantially instantaneously upon application of a sufficient pressing force and then to be returned to its initial position by its resilience, and a plurality of type elements each connected with the inner surface of a respective dome member and movable out of the plane of said disc-shaped member upon inner deflection of the respective dome member.

**4,391,539**

## TAPE-RIBBON PRINTING CARTRIDGE

**Thomas P. Connoy, Lino Lakes, Minn., assignor to Kroy Inc., St. Paul, Minn.**

**Filed May 23, 1980, Ser. No. 152,709**
**Int. Cl.³ B41J *33/14***
**U.S. Cl. 400—208** **9 Claims**



1. A printing cartridge for supplying image carrying tape and printing ribbon to a printing station in a printing apparatus comprising:

a substantially closed cartridge housing having a pair of side walls and an edge wall extending about the periphery of said side walls, said cartridge housing including a tape and ribbon supply section and an elongated guide section, rigidly and integrally joined with, and extending outwardly from, said tape and ribbon supply section for guiding said image carrying tape and printing ribbon, one above the other such that a first flat face of said printing ribbon is superimposed over a first flat face of said image carrying tape, from said tape and ribbon supply section toward the printing station of said printing apparatus;

a supply of image carrying tape disposed within said tape and ribbon supply section;

a supply of printing ribbon disposed within said tape and ribbon supply section;

limit means for limiting movement of said image carrying tape from said tape and ribbon supply section in a generally forward direction and preventing movement of said image carrying tape in a rearward direction, said limit means including a bias resisting member disposed between and at right angles to said side walls and between a portion of said image carrying tape and said printing ribbon and bias means for biasing said image carrying tape against said bias resisting member, said bias means including a leaf spring having one end engaging and biasing said image carrying tape against said bias resisting member.

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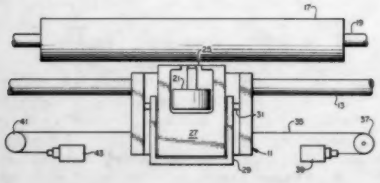
**4,391,540**

## WITHIN-LINE COLOR CHANGE PRINTING

**Edward C. Dougherty, Dracut, Mass., assignor to Centronics Data Computer Corporation, Hudson, N.H.**

**Filed Mar. 31, 1981, Ser. No. 249,483**
**Int. Cl.³ B41J *35/14, 35/16***
**U.S. Cl. 400—212** **8 Claims**



1. In a printer of the type in which a carriage carrying a printhead is traversed on stationary guide means along a paper-supporting platen to form characters by driving a printing element against an inked ribbon interposed between the printhead and the paper, apparatus for shifting the ribbon to bring different colored portions into alignment with the printing head, said apparatus comprising:

means for effecting a change of color within a single line from at least four colors of a multi-color ribbon during carriage traverse and printing of that line entirely independent of the position of the carriage along the line including;

a cable extending generally from one end of the platen to the other;

mounted on said carriage, at least a pair of pulleys over which said cable passes, at least one of said pulleys being mounted so as to be movable with respect to the other as a function of the free length of said cable;

an electromagnetically controlled attachment means for one end of said cable having first and second states, a change between said first and second states providing a predetermined change of a first value in the free length of said cable, said attachment means being fixedly mounted with respect to said guide means;

a second electromagnetically controlled attachment means for the other end of said cable also having first and second states, a change between said first and second states of said second attachment means providing a predetermined change of a second value in the free length of said cable, said second value being different from said first value so that four different combinations of free length of said cable can be realized, said second attachment means also being fixedly mounted with respect to said guide means;

means for variably positioning to at least four positions said multi-color ribbon of at least four colors between said printing element and said platen, said multi-color ribbon being contained in a changeable cassette; and

means coupling said positioning means to said movable pulley whereby the position of the ribbon with respect to the printing element can be varied independently of carriage position by controlling the states of said attachment means.

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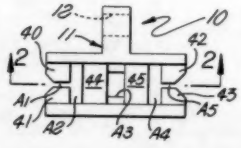
**4,391,541**

## MOSAIC PRINTER AND RIBBON GUIDE THEREFOR

**Robert E. Einem, Glendale, Calif., assignor to International Telephone & Telegraph Corp., New York, N.Y.**

**Filed Nov. 23, 1981, Ser. No. 323,677**
**Int. Cl.³ B41J *35/06***
**U.S. Cl. 400—248** **4 Claims**



1. A printer comprising: a base having a paper support; an inked ribbon approximately parallel to said paper support; means to support each end of said inked ribbon lengthwise thereof over said paper support in a manner to permit a piece of paper to be inserted between said inked ribbon and said paper support; a print head having one end with a plurality of styli with ends in a line extending normal to the lengthwise direction of said inked ribbon thereacross and with axes normal to said inked ribbon; means to guide said one end of said print head over said inked ribbon; and a ribbon guide fixed relative to said one print head end, said ribbon guide including two parallel wings, pairs of first and second projections fixed to, at opposite ends and extending between said wings, said first pair

of projections defining a central longitudinal slot for threading said inked ribbon therethrough, said second pair of projections defining another central longitudinal slot for threading said inked ribbon therethrough, first and second members extending transversely of and connecting said wings at longitudinally spaced positions defining a first transverse slot therebetween, said print head end being fixed within said first transverse slot presenting said styli ends approximately flush to the surfaces of said first and second members closest to said inked ribbon, said first and second pairs of projections being respectively spaced longitudinally from said first and second members and defining respective second and third transverse slots on opposite sides of said first transverse slot and parallel thereto, said first and second members having first and second lower surfaces inclined downwardly toward said one print head end within said first slot, said inked ribbon extending over said first pair of projections, downwardly through said second transverse slot, flush to and over said first inclined surface, said print head end, said second inclined surface, upwardly through said third transverse slot and over the top of said second pair of projections.

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**4,391,542**

## DEVICE FOR THE STEPWISE FEED OF PRINTING MEDIA IN AN ELECTROMECHANICAL PRINT UNIT

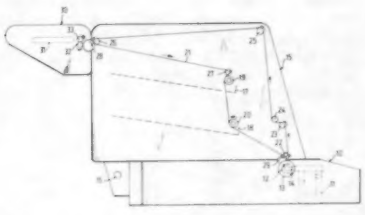
**Günter Baitz, Berlin, Fed. Rep. of Germany, assignor to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany**

**Filed Mar. 19, 1981, Ser. No. 245,300**

**Claims priority, application Fed. Rep. of Germany, Apr. 15, 1980, 3014430**

**Int. Cl.³ B41J *11/50***

**U.S. Cl. 400—605** **18 Claims**



**1.** For use with an electromechanical printer **(10)** of the type having a print unit in which printing media **(55,65)** is moved through the printing unit by a stepping drive roller **(12)** and in which a drive take-off means **(60,61)** is provided down stream in the direction of printing media movement:

a single sheet printing media conveyor **(15)** attached as an accessor to the printer **(10)**; and

a continuous form printing media conveyor **(30)** having drive means **(28)** attached to the single sheet printing media conveyor **(15)** as a further accessory;

a drive belt **(21)** commonly interconnecting the stepping drive roller **(12)**, the take-off means **(60,61)**, the single sheet conveyor **(15)** and the continuous form conveyor drive means **(28)** for synchronous operation in the same feed direction; the take-off means **(60,61)** having rollers of such circumference in engagement with the printing media so as to maintain tension on the printing media when fed therethrough.

**4,391,543**

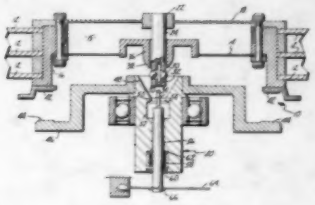
## QUICK DISCONNECT PACK

**John W. Elsing, Edina, Minn., assignor to Magnetic Peripherals Inc., Minneapolis, Minn.**

**Filed Jan. 12, 1981, Ser. No. 224,362**

**Int. Cl.³ F16B *1/00***

**U.S. Cl. 403—24** **15 Claims**



**1.** Apparatus for connecting a disk pack to a disk drive comprising:

a hub adaptable for mounting thereon one or more disks; said hub having a central axis;

a stub axially mounted on said hub;

a spindle mounted on said disk drive and having a central bore with an open end and a central axis; said central bore adapted to receive said stub;

an annular groove disposed in said bore and having an upper shoulder;

at least two recesses disposed in said stub, each having a lower shoulder;

at least two balls movably disposed in relation to both said spindle and said stub and movable between two positions, a first position adapted to allow free movement of said stub into and out of said bore, and a second position adapted to capture said at least two balls between said upper and lower shoulders and prevent said stub from being withdrawn from said bore;

first biasing means for biasing said balls into said second position after said stub has been inserted into said bore to a predetermined extent;

locking means for locking said balls in said second position against a force tending to withdraw said stub from said bore;

moving means for moving said balls into said first position to allow said stub to be withdrawn from said bore; and

restoring force means mounted on said hub and connected to said stub for providing a force tending to withdraw said stub from spindle when said stub extends into said bore said predetermined extent.

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**4,391,544**

## SELF-RETAINED FASTENER

**James W. Cadwallader, Lansdale, Pa., assignor to SPS Technologies, Inc., Jenkintown, Pa.**

**Continuation of Ser. No. 533,103, Dec. 16, 1974, abandoned. This application Jun. 22, 1976, Ser. No. 698,669**

**Int. Cl.³ F16B *41/00***

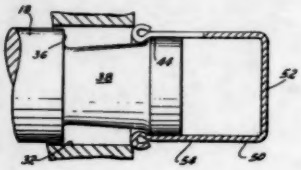
**U.S. Cl. 403—155** **8 Claims**

**1.** A positive lock self-retained fastener assembly for engagement in a workpiece, said fastener assembly comprising:

a pin having a shank and an end segment adjacent said shank at one end of said pin, said end segment including an annular groove disposed axially inwardly from said one end of said pin, said annular groove tapering radially outwardly from the juncture of said shank and said groove axially along said pin toward said one end to a shoulder formed axially inwardly from said one end of said pin; and

a cup-shaped ferrule including collar means formed at the open end thereof to cooperate with said groove and engage said shoulder, thereby to slideably retain said ferrule

on said pin end segment, an end wall and a substantially cylindrical wall segment extending from said end wall and terminating in said collar means, said ferrule further having an axially disposed slot formed through said collar means and a portion of said cylindrical wall segment, said slot having a sufficient length such that said collar means resiliently returns to its initial configuration after radial outward expansion thereof over said end segment and radial inward compression thereof when said ferrule is




inserted in and removed from the workpiece, said ferrule being movable axially along said end segment between a first position wherein said collar means is adjacent the juncture of said shank and said groove and a second position wherein said collar means is adjacent said shoulder, said collar means being compressible in said first position to operatively allow insertion into and removal of said pin and said ferrule from the workpiece and being operative in said second position to retain said fastener in the workpiece.

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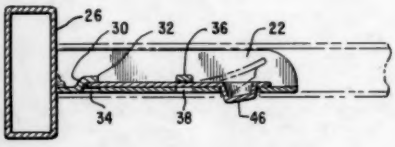
**4,391,545**

## RELEASABLE LOCKING CONNECTOR

**Anthony S. Zummer, Kenilworth, Ill., assignor to Metaport Corporation, Mass.**

**Filed Jan. 31, 1980, Ser. No. 117,252**
**Int. Cl.³ F16B *7/00***
**U.S. Cl. 403—189** **6 Claims**




1. A releasable locking connector for use in a display apparatus comprising: an elongated base having one end adapted to be secured to a member of a display apparatus and the opposite end being free, a catch aperture formed in said base, a stop on said base, and a holding strap on said base positioned between the stop and the catch aperture; a catch mounted on said base, said catch having a dog movably mounted in said catch aperture and extendable through said catch aperture out beyond the surface of the base, a resilient beam having said dog mounted on one end, said beam having the other end in abutment with the stop and a portion between the base and the strap to hold the beam in position, the distance from the edge of the beam abutting the stop to the surface of the dog spaced away from the stop being substantially equal to the distance from the stop to the edge of the catch aperture spaced away from the stop, said stop including a holding lip for engagement with the resilient beam; and a tubular display member mateably receiving the base, said tubular display member having a lock aperture positioned a distance from a free end of the tubular display member equal to the distance between the end of the base adapted to be secured to a member of a display apparatus and the catch aperture in the base, and being alignable with the catch aperture to receive lockably the dog, whereby alignment of the one end of the base secured to a member of a display apparatus with the free end of the tubular display member allows the dog to enter the lock aperture to lock releasably the tubular display member to the base.

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**4,391,546**

## SCREW FIXING

**Robert C. Lyon, Greater Manchester, England, assignor to BICC Public Limited Company, London, England**

**Filed Jan. 6, 1981, Ser. No. 223,004**
**Int. Cl.³ F16B *7/08*; F16L *41/00***
**U.S. Cl. 403—189** **6 Claims**

1. A screw fixing comprising a device and a channel, said device comprising a fitting having walls defining an aperture; a screw having a screw head and a shank, said shank extending through the aperture in the fitting; and a nut threaded on the shank; the screw head and the nut each having a bearing surface directed towards one another, one of said bearing surfaces having parallel ribs which engage said channel; said channel comprising a base and two limbs, each limb having at its free end an inturned flange directed towards the base of the channel, the flanges defining a slot which is open at both ends, said screw slidably fitting in said slot with one of the nut and screw head within the channel beneath the unturned flanges with its bearing surfaces in contact, at least one of the flanges having spaced formed teeth in its free edge directed towards the base of the channel, said teeth interlocking with said parallel ribs of the bearing surface that engages said channel to prevent said device from sliding longitudinally in the channel.

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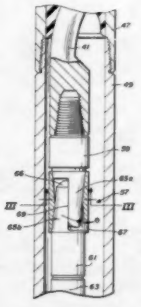
**4,391,547**

## QUICK RELEASE DOWNHOLE MOTOR COUPLING

**G. C. Jackson, Jr., Dallas; Kenneth W. Bramlett, Arlington, and James G. Dennis, Pottsboro, all of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.**

**Filed Nov. 27, 1981, Ser. No. 325,395**
**Int. Cl.³ F16D *1/10***
**U.S. Cl. 403—341** **4 Claims**




1. A quick release shaft coupling assembly for an axially aligned eccentrically rotating upper and lower drive shafts of a downhole motor comprising:

a first stud member mounted on said upper shaft and having downwardly extending clutch dog members defining an outer downwardly inwardly tapered surface and an axially extending torque transmitting surface;

a second stud member mounted on said lower shaft and having upwardly extending clutch dog members defining an outer upwardly inwardly tapered surface and an axially extending torque transmitting surface engaging said like surface of said upper member whereby the upper and lower members are mutually engaged along at least a portion of said axially extending surfaces for transmitting torque therebetween while being free to move generally axially relative to each other; and

a collar member encircling the engaging clutch dog members throughout the axial extent of such engagement said collar member having an internal surface tapered radially inwardly from each end for mating intimate engagement on at least a portion of the outer tapered surfaces of said clutch dog members with all axial thrust transmitted between the opposed shafts being supported through said tapered engaging surfaces between said collar member and said clutch dog members and defining thrust transmitting surfaces for the coupling, whereby any wear of the thrust transmitting surfaces is accommodated by the tapered engagement permitting closer axial positioning between the respective members so that said intimate contact of the collar and said members is constantly maintained during torque transmitting operation.

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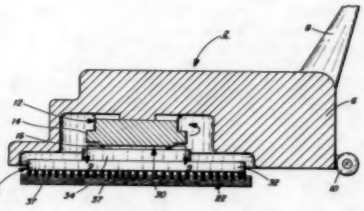
**4,391,548**

## COUPLING DEVICE FOR FLOOR MAINTENANCE MACHINES

**Terrance J. Malish, 2520 Red Fox Pass, Willoughby Hills, Ohio 44094**

**Filed Jan. 15, 1981, Ser. No. 225,368**
**Int. Cl.³ B25G *3/00*; F16D *1/00***
**U.S. Cl. 403—348** **11 Claims**



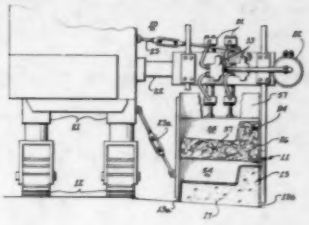
1. A coupling device adapted for use with floor maintenance machines of the type which detachably mounts a brush or pad holder member for carrying a cleaning element, such as a brush or the like, which machine includes a drive shaft having a plurality of integral, drive lugs projecting radially therefrom, said coupling device comprising a plate member having a generally circular opening extending therethrough, said opening having a plurality of circumferentially spaced, arcuate recess portions adapted to receive said drive lugs therethrough, said plate member including a first series of inner peripheral cam-like ramps which communicate at one end with said recess portions on one side of said plate member, and a second series of inner peripheral cam-like ramps communicating with the opposite ends of said recess portions and on the opposite side of said plate member, said second series of cam-like ramps each including multiple tapered surfaces which terminate in integral, arcuate, segmental web portions disposed generally axially opposite associated of said first series of cam-like ramps which ramps and web portions coact for automatic coupling and de-coupling of said plate member relative to said drive shaft lugs.

**4,391,549**

## EXPANSION JOINT INSERTER FOR CONTINUOUS CURB LAYING MACHINES

**Jesse L. Murray, Yuma, Ariz., assignor to The Tanner Companies, Phoenix, Ariz.**

**Filed Oct. 16, 1980, Ser. No. 197,468**
**Int. Cl.³ E01C *23/02***
**U.S. Cl. 404—87** **5 Claims**



2. Apparatus for inserting a piece of expansion joint material into a curb strip of green cast concrete comprising a slip form of predetermined length and curb shape underneath which concrete is to be cast, a slot in said slip form, blade means adapted to move through said slot perpendicularly to the line of said slip form and through any cast concrete curbing, a template attached to one side of said blade for movement therewith, said template having a pushing surface whose outline is the conforming image of the curb surface shape, means for moving said blade into and out of the slot in said slip form, and means for pivoting said blade means clockwise on the insertion stroke and counter-clockwise on the retraction stroke.

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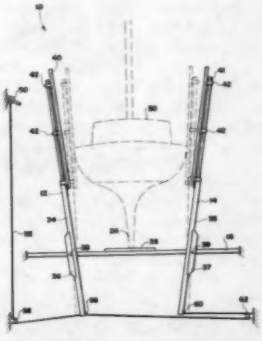
**4,391,550**

## GUNNEL SUPPORT SYSTEM FOR USE WITH A BOAT LIFT

**Henry A. Rutter, Claremore, Okla., assignor to National Hydro-Hoist Company, Claremore, Okla.**

**Filed Jul. 13, 1981, Ser. No. 282,967**
**Int. Cl.³ B63C *5/02***
**U.S. Cl. 405—7** **5 Claims**



1. In combination with a boat lift of the type having a plurality of opposed floatation tanks affixed to a main structure and an intermediate horizontally disposed platform extending therebetween, for receiving and supporting a boat thereon in a substantially longitudinal alignment with said boat lift; a gunnel supporting system which comprises a plurality of paired stabilizing arms, a crossbeam of each pair of stabilizing arms, said crossbeam being horizontally and transversely disposed beneath said platform, each pair of stabilizing arms having a

first stabilizer arm and a second stabilizer arm being transversely spaced from each other, each stabilizer arm being vertically disposed and extending through said platform so as to be pivotally connected to its associated crossbeam, means for pivotally connecting said stabilizer arm to said crossbeam, means for maintaining said stabilizer arm in a relative vertical position, means for pivoting said stabilizer arms toward each other in a transverse plane thereby engaging the sides of a boat within said stabilizer arms, and a means providing transverse adjustment of said stabilizer arms.

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**4,391,551**

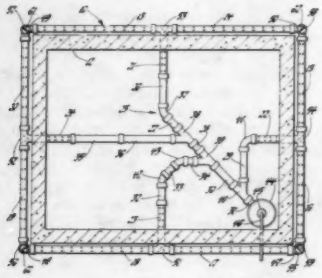
## SNAKE CLEANABLE FLUID FLOW SYSTEM

**Walter C. Belcher, 20221 Melvin, Livonia, Mich. 48152, assignor to Walter C. Belcher and Gloria Jeanne Belcher, both of Livonia, Mich.**

**Filed Mar. 3, 1980, Ser. No. 126,213**

**Int. Cl.³ F16L *45/00***

**U.S. Cl. 405—43** **12 Claims**



**1.** A snake cleanable fluid flow system comprising, in combination, a tee defined by a first passageway having first and second ends and a second passageway which intersects said first passageway; a baffle in said tee for deflecting a snake entering said tee first passageway first end and for deflecting a snake entering said tee first passageway second end into said second passageway; an elbow defined by a first passageway having first and second ends and a second passageway intersecting said elbow first passageway and having a cross section that includes first and second sides; a baffle in said elbow for deflecting a snake entering said first side of said elbow second passageway into said elbow first passageway first end and for deflecting a snake entering said second side of said elbow second passageway into said elbow first passageway second end; pipe means for connecting one of said elbow first passageway ends to one of said tee first passageway ends whereby a snake inserted in one side of said elbow second passageway is deflected by said elbow baffle through said elbow first passageway, said one elbow first passageway end, said pipe means and said one tee first passageway end and is deflected by said tee baffle into said tee second passageway.

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**4,391,552**

## APPARATUS AND METHOD FOR ELIMINATING CHAMPAGNE EFFECT IN COMPRESSED AIR ENERGY STORAGE SYSTEMS

**John W. O'Hara, Concord, Calif., assignor to Bechtel International Corp., San Francisco, Calif.**

**Filed Aug. 24, 1981, Ser. No. 295,893**

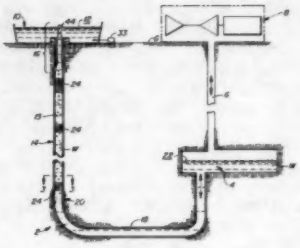
**Int. Cl.³ B65G *5/00***

**U.S. Cl. 405—59** **11 Claims**

**1.** Apparatus for providing a continuous hydrostatic head in a compressed air energy storage system, said system including a water reservoir at ground level, an underground water storage cavern, and a fluid path connecting the cavern and the reservoir, the apparatus comprising:

a generally vertical hydraulic compensating shaft defining at least a portion of said fluid path and having a central axis and an upper end fluidly communicating with the reservoir;

means for fluidly coupling a lower portion of said shaft to said cavern; and



at least one pressurized water discharge nozzle disposed adjacent an inner surface of said shaft at a discharge level spaced from the reservoir and oriented to discharge a stream of water into the shaft in a direction which imparts a rotary motion to a column of water in the shaft so that air bubbles in the water column collect in the vicinity of the axis of said shaft and a tubular column of water is formed which is relatively free of air bubbles and is disposed along walls of the shaft and above the nozzles.

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**4,391,553**

## HYDRAULIC CONTROL SYSTEMS FOR AND METHODS OF CONTROLLING THE OPERATION OF TUNNELLING APPARATUS

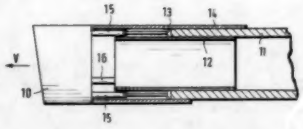
**Walter Weirich, Dortmund, and Herbert Heitkamp, Werne, both of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Fed. Rep. of Germany**

**Filed Jul. 8, 1981, Ser. No. 281,385**

**Claims priority, application Fed. Rep. of Germany, Jul. 9, 1980, 3025922**

**Int. Cl.³ E21D *11/00***

**U.S. Cl. 405—141** **18 Claims**



**1.** In or for tunnelling apparatus which employs a drive shield, a concrete-reception space defined rearwardly of the drive shield to receive concrete, during use, to produce a lining for the tunnel, the space being delimited at the front end by an annular member and double-acting hydraulic rams with first and second working chambers usable to position the annular member; an improved control system for controlling the operation of the rams, said system comprising pumping means for providing hydraulic pressure fluid for charging the working chambers of rams, said pumping means at least including a plurality of individual pump units and a main pump and means for selectively connecting the respective working chambers of the rams to the pump units and to the main pump, wherein the first working chamber of each ram receives pressure fluid from the main pump when the connecting means is set to make the annular member move up towards the drive shield and the second working chamber of said ram, which tends to decrease

in volume when the connecting means is thus set, is connected to a respective one of the pump units which then functions as a brake motor.

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**4,391,554**

## MOORING SYSTEM BEARING FOR A TENSIONED LEG PLATFORM

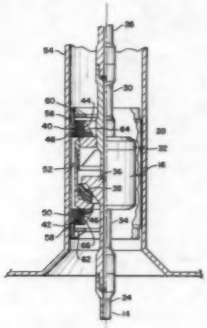
**Darrell L. Jones, Ventura, Calif., assignor to Vetco Offshore, Inc., Ventura, Calif.**

**PCT No. PCT/US80/01025, § 371 Date Aug. 22, 1980, § 102(e) Date Aug. 22, 1980, PCT Pub. No. WO82/00621, PCT Pub. Date Mar. 4, 1982**

**PCT Filed Aug. 22, 1980, Ser. No. 266,023**

**Int. Cl.³ B63B *21/50***

**U.S. Cl. 405—224** **10 Claims**



1. A mooring system bearing apparatus for a tensioned leg platform having a vertical mooring tunnel through which the tension leg passes comprising: an upper tension leg connecting means; a lower tension leg connecting means; a universal flexible connector having an external body rigidly connected to said upper connector means, an internal body rigidly connected to said lower connector means, and means for conducting axial forces along the tension leg through the connector while permitting pivotal motion of the lower tension leg around the connector; at least one cylindrical elastomeric bearing having a first side attached to said external body; an elongated bearing sleeve surrounding said external body and attached to a second side of said elastomeric bearing, said sleeve sized and shaped to conform to the inside of said mooring tunnel.

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**4,391,555**

## PROCESS FOR CONSOLIDATING GEOLOGICAL FORMATIONS

**Jacques Burger, Bougival; Charles Bardon, and Claude Gadelle, both of Rueil-Malmaison, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France**

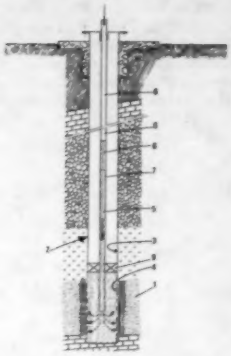
**Filed Dec. 24, 1980, Ser. No. 219,604**

**Claims priority, application France, Dec. 28, 1979, 79 32018**

**Int. Cl.³ E02D *3/12*; E21B *33/138***

**U.S. Cl. 405—264** **22 Claims**

2. In a process for consolidating a geological formation comprising injecting into the formation a liquid organic mixture containing at least one polymerizable chemical compound, and injecting, in situ, at the contact of an oxidizing gas, to cause reactions starting at the normal temperature of the formation and leading to the production of a solid product which consolidates this formation without substantially reducing its permeability, the improvement wherein the organic mixture injected contains a catalyst comprising in combination: (a) at least one of barium, zirconium, cerium, or a lanthanide,



and (b) at least one of vanadium, manganese, iron, cobalt, or zinc.

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**4,391,556**

## PROCESS FOR CONSOLIDATING GEOLOGICAL FORMATIONS

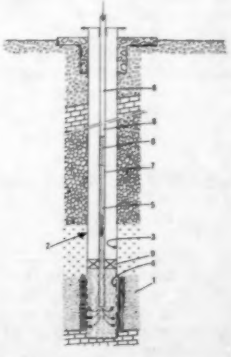
**Jacques Burger, Bougival; Charles Bardon, and Claude Gadelle, both of Rueil Malmaison, all of France, assignors to Institut Francais Du Petrole, Rueil-Malmaison, France**

**Filed Dec. 24, 1980, Ser. No. 219,605**

**Claims priority, application France, Dec. 28, 1979, 79 32017**

**Int. Cl.³ E02D *3/12*; E21B *33/138***

**U.S. Cl. 405—264** **16 Claims**



6. In a process for consolidating a geological formation, comprising injecting into the formation a liquid organic mixture containing at least one polymerizable chemical compound and a catalyst, and injecting, in situ, an oxidizing gas, to cause reactions starting at the normal temperature of the formation and leading to the production of a solid product which consolidates this formation without substantially reducing its permeability, the improvement comprising employing as said catalyst, in combination: (a) lead and (b) at least one of nickel, copper or zinc.

**4,391,557**

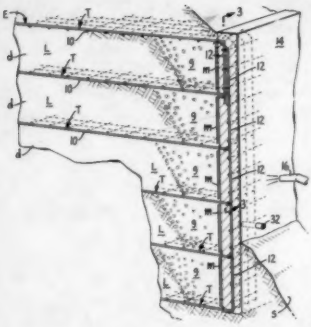
## RETAINING WALL FOR EARTHEN FORMATIONS AND METHOD OF MAKING THE SAME

**William K. Hilfiker, Eureka, Calif.; Harold O. Hilfiker, deceased, late of Eureka, Calif. (by Louise E. Hilfiker, executor), and William B. Hilfiker, Eureka, Calif., assignors to Hilfiker Pipe Co., Eureka, Calif.**

**Continuation-in-part of Ser. No. 56,826, Jul. 12, 1979, Pat. No. 4,329,089. This application Nov. 12, 1981, Ser. No. 320,326**

**Int. Cl.³ E02D** *5/20, 29/02*

**U.S. Cl. 405—287** **8 Claims**



1. A retaining wall structure comprising: a generally rectangular steel wire tray defined by an elongate floor section extending over the length of the tray and a face section of a depth less than the length of the floor section extending at an angle relative to the floor section, said tray having longitudinal rods extending continuously over the length thereof and across said floor and face sections in spaced, generally parallel relationship to one another and cross rods welded to and extending transversely across said longitudinal rods in spaced relationship to one another; a screen disposed in spaced, generally parallel relationship to the face section to the side thereof from which the floor section extends, said screen being generally coextensive with the face section; and a concrete face coextensive with and cast around said face section, said face being disposed between the mat and face section and being of a thickness sufficient to extend beyond the side of the face section opposite that from which the floor section extends whereby the face section functions to reinforce the face.

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**4,391,558**

## DRILL JIG

**LaRelle T. Perry, 104 30 W. Cut Off, Northboro, Mass. 01532**

**Filed Dec. 1, 1980, Ser. No. 211,505**

**Int. Cl.³ B23B** *49/00*

**U.S. Cl. 408—110** **8 Claims**

1. A portable drill jig for guiding a drill bit to bore holes in a surface at any preselected compound angle and supporting said drill bit and a hand drill having a driving shaft with a threaded end and an arbor for supporting said drill bit with a tapped opening for screwably engaging said threaded end for driving said drill bit comprising;

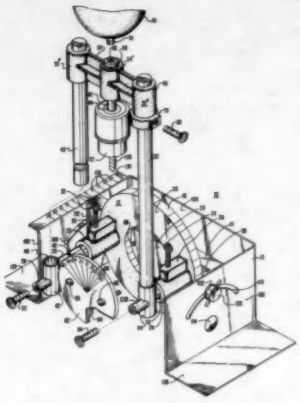
a frame having bottom surfaces defining a bottom plane for seating upon said surface;

a support member having a planar face, said support member being pivotally mounted on said frame for angular displacement in a first plane substantially orthogonal to said planar face;

guide means for guiding said drill bit being linearly displaced relative to said frame in a second plane substantially orthogonal to said planar face of said support member; and

means for pivotally mounting said guide means on said support member for angular displacement in a plane substantially parallel to said planar face of said support member,

said guide means comprising arbor extension means threaded at one end for screwably engaging the tapped opening of said arbor and tapped at the other end for screwably engaging the threaded end of said driving shaft and bearing means for rotatably supporting said arbor,



whereby linear displacement of said guide means relative to said frame with said arbor extension means screwably engaging said arbor and said drive shaft allows said drill bit to drill a hole in said surface at any preselected compound angle related to the angular displacement of said support member in said first plane and the angular displacement of said guide means in said plane substantially parallel to said planar face of said support member.

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**4,391,559**

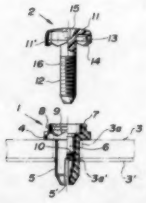
## PLASTIC FASTENER

**Akira Mizusawa, Fujisawa, Japan, assignor to Nifco Inc., Tokyo, Japan**

**Filed Jul. 28, 1980, Ser. No. 173,230**

**Int. Cl.³ F16B** *13/04*

**U.S. Cl. 411—45** **1 Claim**



1. A plastic fastener comprising a female member provided with a flange, a leg extended downwardly from the lower side of the flange and adapted to permit increase in the outside diameter of the barrel portion thereof, and an insertion hole bored longitudinally along the axis of the leg downwardly from the upper surface of the flange and a male member provided with a head portion and a shaft portion extended downwardly from the lower side of the head portion and adapted to be inserted into the insertion hole of the female member, whereby panels put together face to face are brought into tight union by inserting the leg of the female member into through holes bored at exactly corresponding position in the panels and

subsequently forcibly driving the shaft portion of the male member into the insertion hole of the female member thereby keeping the leg in its radially expanded state, which plastic fastener is characterized by providing on the upper surface of the flange of the female member and on the lower surface of the head portion of the male member respectively a plurality of circumferentially spaced undulating cam surfaces disposed around the common axis of the two members and matched so that cam faces are brought into intimate contact at the time of forced driving of the male member and, at the time of release of the fast union of the panels, the cam faces are caused to slide on each other by a rotation of the male member and consequently the head portion of the male member is lifted from the upper surface of the flange of the female member, the shaft portion of the male member having thread configurations formed thereon and at least a portion of the internal wall of the female member including means to threadingly mate with said thread configuration to assist in the retraction of the male member, wherein the flange of the female member has a boss portion of the shape of a short circular column formed at the center on the upper surface thereof, an annular fitting recess formed on the peripheral surface of the boss portion and an undulated cam face formed in the upper surface encircling the boss portion, while the head portion of the male member is formed in the shape of a cap containing a descending rim capable of embracing said boss portion and has a fitting protuberance formed on the inner wall surface of the descending rim of the cap so as to be matched to the fitting recess and an undulated cam face formed on the lower surface of the descending rim so as to be matched to the undulated cam face on the flange, the axial dimension of the fitting recess and the fitting protuberance being substantially equal so as to be functionally interrelated with the undulating cam faces in that relative rotary movement between the male and female members releases the locking interengagement between said protuberance and recess.

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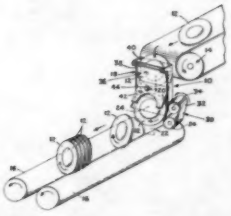
**4,391,560**

## LID INFEED FOR SPINNING ROD RESTACKER

**Carlos Fardin, Paterson, N.J., assignor to Van Dam Machine Corporation of America, West Paterson, N.J.**

**Filed Oct. 14, 1981, Ser. No. 311,217**
**Int. Cl.³ B65G *47/24***
**U.S. Cl. 414—107** **15 Claims**



1. An assembly for the transfer of container lids from the end-to-end prone disposition on a conveyor, to a stack thereof with the lids supported on their rims between at least two spinning rods rotating about a generally horizontal axis, comprising:

A. at least one chute disposed adjacent and extending above said stack, having an upper and a lower vertical slideway, and an intermediate slideway defining a two dimensional forward incline, said incline in two adjacent perpendicular planes and at an acute angle with respect to the vertical dimension, to guide said container lids forward and sidewise to said stack;

B. at least one pair of side walls associated with said chute along at least a portion of the lateral periphery thereof, to guide and retain said container lids as they pass along said slideways;

C. at least one movable wall disposed with its longitudinal dimension at an acute angle with respect to the vertical, and proximate to one of said spinning rods, said movable wall having a movement complementary with the surface rotation of the proximate spinning rod, and positioned to receive and impart surface rotation to the rims of the descending container lids; and

D. at least one horizontally pivotable gate located forward of said chute and in a plane generally parallel to said upper and said intermediate slideways, to retain said container lids traveling downwardly thereon.

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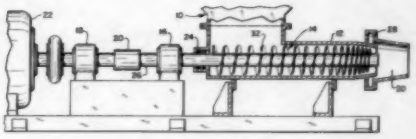
**4,391,561**

## SOLIDS PUMPING APPARATUS

**Donald A. Smith, Haddam, Conn., and Bruce M. Pote, Playa del Rey, Calif., assignors to Combustion Engineering, Inc., Windsor, Conn.**

**PCT No. PCT/US81/00485, § 371 Date Apr. 13, 1981, § 102(e) Date Apr. 13, 1981, PCT Pub. No. WO82/03615, PCT Pub. Date Oct. 28, 1982**
**PCT Filed Apr. 13, 1981, Ser. No. 343,688**
**Int. Cl.³ B65G *53/48***
**U.S. Cl. 414—218** **12 Claims**



1. An apparatus for feeding a granular material into a pressurized zone comprising: a stationary hollow cylinder having a bore; a frustoconical reducing nozzle located at a discharge end of said cylinder; means for feeding the granular material into said cylinder at an upstream located of said cylinder; a rotary feeder screw concentrically located within said cylinder and having helical flights thereon, said flights having a decreasing pitch towards the discharge end; means for rotating said feed screw at high speeds; said flights having an OD only slightly less than said bore through a majority of the length of said feed screw, and having a tapered decreasing OD at the discharge end, the taper being at least as great as that of said nozzle; said feed screw being located within said cylinder such that the radial clearance between the nozzle bore and the tapered flights is significantly greater than that between the bore of the cylinder and the flights through the majority of length, and the tapered flight extending through only a portion of said nozzle; and a columnar plug rotating with said screw and concentrically located with said nozzle.

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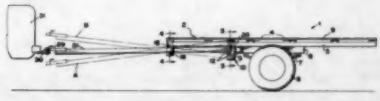
**4,391,562**

## ADJUSTABLE TRAILER DRAWBAR

**Randall H. Hetzner, 6750 Holland Rd., Saginaw, Mich. 48601**

**Filed May 7, 1981, Ser. No. 261,734**
**Int. Cl.³ B60P *1/28*; B60D *1/14***
**U.S. Cl. 414—483** **8 Claims**



1. In a trailer having a frame, ground engaging wheels, means mounting said wheels on said frame, a trailer bed, and a drawbar for coupling said frame to a towing vehicle, the improvement comprising an anchor member fixed to said frame

between its forward and rearward ends, said anchor member having a number of vertically spaced attachment points; means forming a fulcrum adjacent the forward end of said frame and on which said drawbar bears, said fulcrum being located at a level between those of the uppermost and lowermost of said attachment points thereby enabling said drawbar to rock about said fulcrum to a selected position in which its rearward end is at a level above, below, or corresponding to the level of said fulcrum; hitch means at the forward end of said drawbar for coupling the latter to said towing vehicle; and anchor means separably connecting said drawbar at its rearward end to said anchor member at a selected one of said attachment points, said one of said attachment points being so selected that said trailer bed is substantially horizontal when said drawbar is coupled to said towing vehicle.

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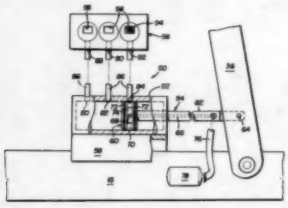
**4,391,563**

## BUCKET POSITION INDICATOR ASSEMBLY

**Francis H. Vietor, Terre Haute, Ind., assignor to J. I. Case Company, Racine, Wis.**

**Filed Aug. 31, 1981, Ser. No. 297,890**
**Int. Cl.³ B23Q *19/00***
**U.S. Cl. 414—698** **1 Claim**



1. In a front end loader including an elongated main body having an operator's compartment mounted thereon, a pair of lift arms pivotally connected to said main body and a bucket rotatably mounted between said lift arms, said bucket being rotated by a plural element linkage to various positions during its work cycle including rollback, level, and rollout positions, the improvement comprising:

a bucket position indicator assembly including a fluid cylinder, a slidable actuator, and an indicator panel, said indicator panel being mounted within said operator's compartment, said fluid cylinder being attached to one of said lift arms, said actuator comprising a piston which is slidably mounted within said fluid cylinder and a rod member connected to said piston and also pivotally attached to one of said linkage elements for reciprocal movement in response to rotational movement by said bucket, said piston being slidably movable within said fluid cylinder in response to rotational movement of said bucket during its work cycle, said rod member including an interior bore which is open at one end for permitting fluid pressure to escape into a sealed fluid chamber formed partially by a recess in said piston surrounded by sealing means carried by said piston and partially by said cylinder, and means for constantly communicating fluid pressure to the other end of said interior bore;

said fluid cylinder including a plurality of orifices along its length which are connected by conduits to corresponding fluid inputs at said indicator panel, said sealed fluid chamber becoming aligned with one of said orifices when said bucket is in each of the rollback, level, or rollout positions thereby permitting fluid pressure to be applied to only a corresponding one of said indicator panel inputs, indicator members movably mounted within said indicator panel, said indicator members being movable between non-visible and visible positions, each indicator member being in fluid communication with only one of said inputs to said indicator panel, only one of said indicator members becoming visible to an operator when fluid pressure enters a corresponding indicator panel input thereby indicating to the operator that the bucket is in either its rollback, level, or rollout position.

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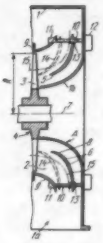
**4,391,564**

## EXHAUST PIPE OF TURBINE

**Anatoly V. Garkusha, ulitsa 23 Avgusta, 63, kv. 82, and Vladimir E. Dobrynin, pereulok Zernovoi, 6/4, kv. 49, both of, Kharkov, U.S.S.R.**

**PCT No. PCT/SU79/00116, § 371 Date Jul. 27, 1980, § 102(e) Date Jul. 23, 1980, PCT Pub. No. WO80/01093, PCT Pub. Date May 29, 1980**
**PCT Filed Nov. 27, 1979, Ser. No. 198,108**
**Claims priority, application U.S.S.R., Nov. 27, 1978, 2689216**
**Int. Cl.³ F01D *25/24, 25/30***
**U.S. Cl. 415—126** **19 Claims**



1. An exhaust pipe for a turbine having a given axial thermal expansion and a last stage including a runner terminating outwardly in blades, comprising:

a housing having walls defining a flow duct;

a baffle in said duct;

said baffle having a side surface in the form of a surface of revolution and an inlet portion having a radius shorter than the outer radius of said blades of said runner;

said baffle having the longitudinal axis thereof substantially coincident with the axis of said turbine; and

guide means mounted in said duct for adjustably supporting said baffle relative to said housing in a direction axial and transversal of said axis of said turbine.

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**4,391,565**

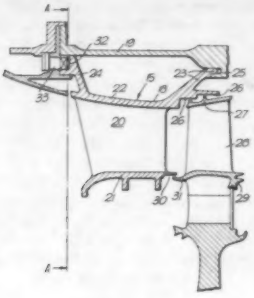
## NOZZLE GUIDE VANE ASSEMBLIES FOR TURBOMACHINES

**Trevor H. Speak, Gloucestershire, England, assignor to Rolls-Royce Limited, London, England**

**Filed May 22, 1981, Ser. No. 266,493**
**Claims priority, application United Kingdom, May 31, 1980, 8017888**
**Int. Cl.³ F01D *9/04***
**U.S. Cl. 415—189** **3 Claims**

1. A guide vane assembly for a turbomachine comprising a plurality of segments, each segment having one or more guide vanes and each segment being mounted in an outercasing by means of a pin located in a slot wherein either the slot is provided in each segment and each pin is carried in the outer casing or the slot is in the outer casing and each pin is carried by each segment, each slot being angled to a radial plane relative to the segment so that, in use, forces due to the gas loads acting on each segment are reacted by a force exerted by the pin in a direction normal to the length of the slot, the radially inward component of the force exerted by each pin and the

radially outward component of the gas load produces a first couple on the segment that opposes a second couple produced



on the segment by the tangential component of the gas loads and the tangential component of the force exerted by the pin.

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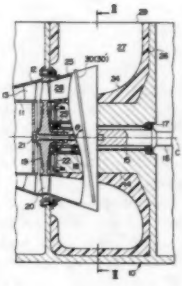
**4,391,566**

## DIFFUSER AND EXHAUST GAS COLLECTOR ARRANGEMENT

**Tousaku Takamura, Yokohama, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Nov. 3, 1980, Ser. No. 203,381**
**Claims priority, application Japan, Nov. 14, 1979, 54-146444**
**Int. Cl.³ F01D *25/30*; F04D *29/44***
**U.S. Cl. 415—209** **2 Claims**



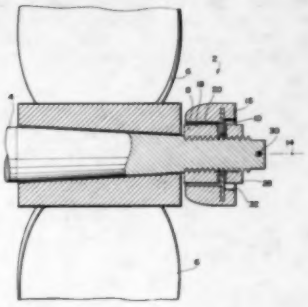
1. A gas turbine engine comprising a diffuser composed of inner and outer wall members having a common center axis and radially spaced apart from each other for forming therebetween a diffuser chamber having an annular cross section and axially opposite gas inlet and outlet ends, the outer wall member having a generally frusto-conical peripheral surface axially enlarging in diameter from the gas inlet toward the gas outlet end of the diffuser chamber, a stationary casing structure housing therein said diffuser to form an exhaust gas collector chamber surrounding said outer wall member and having a gas discharge end directed substantially perpendicularly to said common center axis, and a pair of ribs extending arcuately on the outer peripheral surface of said outer wall member and curved about said center aixs, wherein each of said ribs has an outer peripheral end extending with a radius of curvature which is gradually reduced toward said gas discharge end of said exhaust collector chamber.

**4,391,567**

## CORROSION PREVENTING DEVICE FOR A MARINE PROPELLER

**Dominick Ciampolillo, 5300 95th St., N., St. Petersburg, Fla. 33708**

**Filed May 4, 1981, Ser. No. 259,811**
**Int. Cl.³ B63L *1/18***
**U.S. Cl. 416—146 R** **2 Claims**



1. A corrosion preventing device for mounting in sea water on an electrically conductive propeller shaft supporting a marine propeller composed of a metal having a first galvanic potential, the propeller being fastened to the shaft by an electrically conductive propeller nut, and in electrical contact therewith, comprising:

an annular washer having a generally circular raised rim about the periphery thereof forming a generally cup-shaped surface, composed of a metal having a second galvanic potential not greater than said first galvanic potential, with a central hole concentric with the circular axis thereof through which said shaft may fit to enable electrically conductive mounting proximate to said propeller nut, for serving as an electrolytic cathode of the device;

a generally torroidal anode having a circular periphery concentric with said axis, composed of a metal having a third galvanic potential greater than said first galvanic potential, cast about said rim on the periphery of said annular washer and exposed to said sea water, for serving as an electrolytic, sacrificial anode of the device;

said rim of said annular washer providing centripetal support to said torroidal anode to prevent the anode from mechanical disintegration during rotation at high angular velocities while the anode is in a state of protracted sacrificial corrosion.

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**4,391,568**

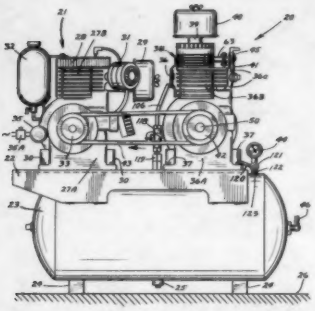
## GAS COMPRESSOR

**William L. Tenney, Crystal Bay, Minn. 55323**

**Continuation of Ser. No. 917,185, Jun. 6, 1978, abandoned. This application Feb. 25, 1981, Ser. No. 238,011**
**Int. Cl.³ F04B *41/04, 17/00***
**U.S. Cl. 417—237** **13 Claims**

1. A system for compressing and delivering partly cooled gas to a desired location, comprising: a tank for storing compressed gas, a platform secured to the tank, a conventional air cooled four-cycle single cylinder internal combustion engine mounted on the platform, a gas compressor mounted on the platform whereby the tank, platform, engine, and compressor form a unit-handled assembly, means drivably connecting said engine to said gas compressor whereby the engine drives the gas compressor, said compressor comprising engine components of an identical air cooled four-cycle single cylinder internal combustion engine including a crankcase assembly, a cylinder attached to the crankcase assembly, a piston, said cylinder

having a bore accommodating said piston, crankshaft means connected to the piston, and blower means connected to the crankshaft means for moving aspirated air toward the cylinder, shroud means surrounding the blower means for directing air toward the cylinder, and compressor components including a valve assembly mounted on the upper end of said cylinder for controlling the flow of gas into and out of the bore in response to movement of the piston therein, head means located in superposed engagement with said valve assembly, said valve assembly spacing the head means from said cylinder to form an open space between the head means and said cylinder to minimize the transfer of heat from the head means to said cylinder, said head means having a gas inlet port and a compressed gas



discharge port in cooperative relationship to said valve assembly for gas flow control, means to connect the head means to the cylinder and secure the valve assembly therebetween, an after cooler conduit connected to said head discharge port for carrying hot compressed gas from said head means to the tank, said conduit including an arcuate portion disposed in circumambient relation to said blower means in the inlet path of the aspirated air theretoward, and shield means connected to the shroud means centrally of said arcuate portion of the conduit in spaced relation to said shroud means and blower means for confining said aspirated inlet air flow substantially radially inwardly over and around said arcuate conduit portion toward said blower means.

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**4,391,569**

## POSITIVE DISPLACEMENT PUMP SYSTEMS

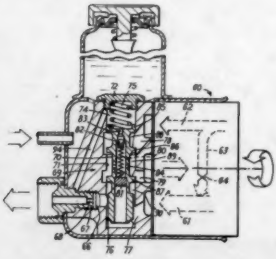
**Ian T. Bristow, Higham, and Alec Thornelow, Chatham, both of England, assignors to Hobourn-Eaton Limited, Rochester, England**

**Filed Dec. 10, 1979, Ser. No. 101,791**

**Claims priority, application United Kingdom, Dec. 13, 1978, 48271/78**

**Int. Cl.³ F04B *47/00***

**U.S. Cl. 417—302** **21 Claims**



1. A positive displacement pump system having first and second delivery passages for first and second flows of pumped fluid respectively, a main discharge passage for pumped fluid, overspill ducting, and valve means comprising a control valve controlling the apportionment of the first flow between the main discharge passage and the overspill ducting as a function of the delivery pressure of the first flow in a sense to increase the proportion of the first flow by-passed to the overspill ducting as said pressure increases and to decrease the proportion of the first flow by-passed to the overspill ducting as said pressure decreases, a transfer passage through which fluid can flow from the second delivery passage to join the first flow, said value means further comprising a transfer valve controlling, as a function of the delivery pressure of the first flow, the apportionment of the second flow between the overspill ducting and said transfer passage, the proportion of the second flow by-passed to the overspill ducting increasing with increase of the delivery pressure of the first flow and decreasing with decrease of the delivery pressure of the first flow.

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**4,391,570**

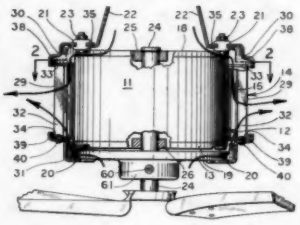
## APPARATUS FOR COOLING A CEILING MOUNTED FAN MOTOR

**Clarence Stutzman, 1429 Reedsburg North, Wooster, Ohio 44691**

**Filed Apr. 29, 1981, Ser. No. 258,669**

**Int. Cl.³ F04B *17/00, 35/04***

**U.S. Cl. 417—353** **8 Claims**



1. An apparatus for cooling a motor having a housing within which all windings are enclosed, the housing having a substantially cylindrical side and two end plates, each end plate having bearing means mounted centrally therein, the motor having a rotatable shaft journaled in the bearing means, comprising:

annular top cap means in concentrically fixed spatial relation with one of the end plates, annular bottom cap means in concentrically rotatable spatial relation with the other of the end plates, fan means for simultaneously drawing cooling air through the inner peripheries of said top and bottom cap means in the vicinity of said bearing means, across both ends of the housing and the side of the housing and forceably discharging said air laterally away from the side of the housing.

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**4,391,571**

## PUMPING APPARATUS FOR PUMPING LIQUIDS SUCH AS SLURRYS

**Thomas A. Craggs, 49, Pacific Rd., Trentham, Stoke-on-Trent, Staffordshire, England**

**PCT No. PCT/GB79/00163, § 371 Date Jun. 13, 1980, § 102(e) Date Jun. 13, 1980, PCT Pub. No. WO80/00867, PCT Pub. Date May 1, 1980**

**PCT Filed Oct. 12, 1979, Ser. No. 193,188**

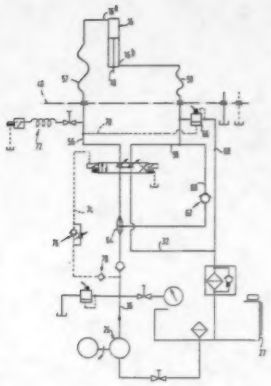
**Claims priority, application United Kingdom, Oct. 14, 1978, 40592/78**

**Int. Cl.³ F04B *17/00***

**U.S. Cl. 417—403** **12 Claims**

3. Apparatus for use in the pumping of a slurry and comprising a pumping device comprising a cylinder and a piston

mounted therein, and which is operative to cause liquid to be drawn through an inlet port of the cylinder and expelled through an outlet port thereof, an operating device comprising a cylinder and a piston mounted therein, a fluid pressure circuit which includes a fluid sump, a pump operative to pump fluid under pressure to the operating device, and valve mechanism operative to control the admission of fluid under pressure to



the operating device, and a connecting member extending between the piston of the pumping device and the piston of the operating device, wherein during an initial part of each pumping operation of the apparatus, part of the fluid flowing from the low pressure side of the fluid pressure circuit is returned directly to the high pressure side of the fluid pressure circuit, and part is returned to the sump of the fluid pressure circuit.

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**4,391,572**

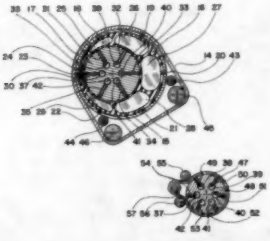
## ANGULAR POSITION BELT VALVE PUMP

**Hyok S. Lew, 7890 Oak St., Arvada, Colo. 80005**

**Filed Nov. 12, 1980, Ser. No. 206,302**

**Int. Cl.³ F01C** *5/00, 21/12;* **F04B** *43/12;* **F16K** *3/26*

**U.S. Cl. 418—45** **3 Claims**



1. An angular position belt valve pump or motor comprising:

(a) an angular position belt valve including:

(1) a first rotatable circular cylinder including a plurality of axial holes, each of said axial holes having one or more openings to the cylindrical surface of said first rotatable circular cylinder;

(2) a first belt wrapped around said first rotatable circular cylinder over a wrap angle less than 360 degrees;

(3) first one or more idlers training the path and the wrap angle of said first belt; wherein, the plurality of said one or more openings disposed on said cylindrical surface of said first rotatable circular cylinder and connected to each of said plurality of axial holes become cyclically open and closed as said plurality of said one or more openings become wrapped and unwrapped by said first belt when said first rotatable circular cylinder is rotated;

(b) a pumping assembly including:

(1) a second rotatable circular cylinder rigidly connected to said first rotatable circular cylinder of said angular position belt valve in a coaxial relationship wherein said plurality of the axial holes included in said first rotatable circular cylinder extend to said second rotatable circular cylinder;

(2) a circular cylindrical shell disposed around said second rotatable circular cylinder in an eccentric relationship;

(3) a plurality of the expanding-contracting chambers disposed intermediate said second rotatable circular cylinder and said circular cylindrical shell; each of said plurality of the expanding-contracting chambers including one or more openings to each of said axial holes and one or more openings to the cylindrical surface of said circular cylindrical shell;

(4) a second belt wrapped around said circular cylindrical shell over a wrap angle less than 360 degrees; and

(5) second one or more idlers training the path and the wrap angle of said second belt and maintaining the eccentric position of said circular cylindrical shell with respect to said second rotatable circular cylinder wherein the expanding chamber of said plurality of the expanding-contracting chambers takes in the fluid medium through said one or more openings to the cylindrical surface of said first rotatable circular cylinder unwrapped by said first belt and the contracting chamber of said plurality of the expanding-contracting chambers discharges the fluid medium through said one or more openings to the cylindrical surface of said circular cylindrical shell unwrapped by said second belt when said first and second rotatable cylinders are rotated.

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**4,391,573**

## HORIZONTAL ROTARY COMPRESSOR WITH OIL FORCED BY GAS DISCHARGE INTO CRANKSHAFT BORE

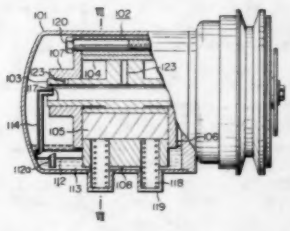
**Hideharu Tanaka, Amagasaki; Koji Ishijima, and Toshihide Koda, both of Shizuoka, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 99,727, Dec. 4, 1979, Pat. No. 4,355,963. This application Aug. 25, 1981, Ser. No. 296,054**

**Claims priority, application Japan, Dec. 28, 1978, 53-166076; Jan. 5, 1979, 54-512**

**Int. Cl.³ F04C** *18/00, 29/02;* **F16N** *7/30, 21/00*

**U.S. Cl. 418—63** **2 Claims**



1. A horizontal rotary type compressor comprising:

a closed shell;

a rotary compression unit housed within said closed shell, said rotary compression unit having a cylinder, a cylinder head and a frame enclosing both ends of said cylinder, a piston eccentrically rotatable in said cylinder about an axis extending horizontally, a crankshaft fitted in said piston and having a central axial lubrication bore, and a vane dividing the space defined within said cylinder by said

piston, cylinder head and frame into a suction and a compression chamber;

said rotary compression unit further having a refrigerant discharge port;

a refrigerant gas discharge pipe connected at one end to said refrigerant gas discharge port and having the other end below the surface level of lubricant oil accumulated in the bottom of said closed shell and having the downstream end closed;

a lubricant oil-gas feed tube having one end opening into said closed downstream end and having the other end opening into said central lubrication bore in said crankshaft, a suction pipe extending downwards into the space where oil is accumulated in said closed shell and closely adjacent to the closed end of the closed downstream end of said refrigerant gas pipe and having the upper end obliquely cut and with the opening facing downstream in the refrigerant gas flow for generating a negative dynamic pressure due to refrigerant gas flow and facing said one end of said lubricant oil-gas feed pipe, whereby lubricant oil accumulated in the bottom of said closed shell is supplied to said lubrication bore in said crankshaft through said refrigerant gas discharge pipe.

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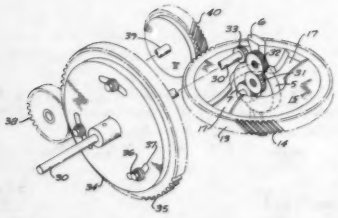
**4,391,574**

## ROTARY POSITIVE DISPLACEMENT MECHANISM

**Louis W. Medel, Jr., Sylmar, and Yoram Barak, Woodland Hills, both of Calif., assignors to Helen H. Noga, Los Angeles, Calif., a part interest**

**Filed Mar. 13, 1980, Ser. No. 130,191**
**Int. Cl.³ F01C *3/02***
**U.S. Cl. 418—195** **6 Claims**



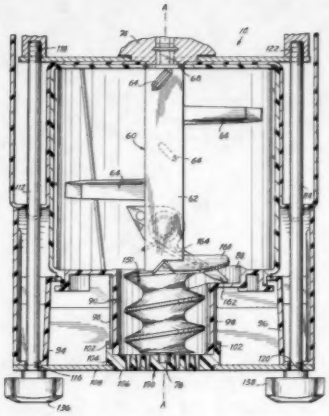
1. A rotary positive displacement device having a housing: a first cylindrical chamber and a second cylindrical chamber in said housing, a first rotor and a second rotor rotatable within said first and second chambers, respectively, each said rotor being rotatable about the same center point, said first rotor rotating in a plane which is substantially perpendicular to the plane in which said second rotor rotates; a thrust bearing within said second chamber upon which said second rotor rotates; said first rotor comprising a rotor body having a plurality of vanes extending outwardly therefrom; said second rotor having a rim gear with a plurality of vanes extending inwardly therefrom, said second rotor vanes being designed and constructed to create a void space between them, said void space comprising a center circular space and a plurality of outer spaces, said center space being of sufficient diameter to allow said first rotor body to rotate therein; and said outer spaces being of sufficient size to allow said first rotor vanes to pass therethrough; said outer spaces being broadly hyperbolic in shape; each said vane having a leading and trailing edge, and each said edge being arcuate in shape and having a knife-like configuration such that there is substantial continuous meshing between corresponding said first and said second rotor vanes during interdigitation when said rotors are rotated in either direction to reduce fluid backpressure.

**4,391,575**

## KITCHEN APPLIANCE FOR MAKING FARINACEOUS PRODUCTS

**Harold Osrow, Dix Hills, N.Y., assignor to Osrow Products Corp., Old Bethpage, N.Y.**

**Filed Sep. 5, 1980, Ser. No. 184,351**
**Int. Cl.³ B29B *1/06***
**U.S. Cl. 425—190** **21 Claims**



1. A kitchen appliance for making farinaceous products such as spaghetti, fettucini, macaroni, manicotti, lasagna, pizza crusts, taco shells, bagels, breadsticks and like dough foodstuffs, comprising:

(a) a housing having a mixing chamber for receiving the ingredients of a selected farinaceous product to be made, said housing having a bottom wall;

(b) mixer means for mixing the ingredients, including a mixer shaft mounted in the mixing chamber for rotation about a generally horizontal axis of rotation, and at least one mixer element mounted on the mixer shaft for joint rotation therewith to mix the ingredients;

(c) an extruding chamber mounted on the housing in axially spaced relationship with the mixing chamber, said housing having a discharge outlet and a bottom wall elevated above the bottom wall of the mixing chamber;

(d) wall means bounding a feed chamber located intermediate of, and in open communication between, the mixing chamber and the extruding chamber, said feed chamber having a raised entry zone located above said axis of rotation;

(e) stuffer means mounted on the mixer shaft for joint rotation therewith, and operative for raising the mixed ingredients above said axis of rotation, and for feeding the raised ingredients in metered manner into the raised entry zone for subsequent passage to the extruding chamber;

(f) extruder means for extruding the mixed ingredients from the discharge outlet, including an extruder screw mounted in the extruding chamber for rotation about said axis of rotation, said extruder screw and said mixer shaft extending co-linearly along, and being jointly rotatable about, said same axis of rotation; and

(g) drive means for jointly turning the mixer shaft, the stuffer means, and the extruder screw simultaneously about said same axis of rotation in a predetermined circumferential direction to effect mixing only of the ingredients, and at the user's option, in the circumferential direction opposite to the predetermined direction to effect lifting of the mixed ingredients, depositing of the mixed ingredients into the raised entry zone in a metered manner, and extrusion of the farinaceous product to be made through the discharge outlet, said drive means including a reversible

electrical motor and actuating means for energizing the motor to turn the mixer shaft and the extruder screw in either one of the predetermined and opposite circumferential directions,

whereby farinaceous products can be made in the kitchen in small-scale quantities.

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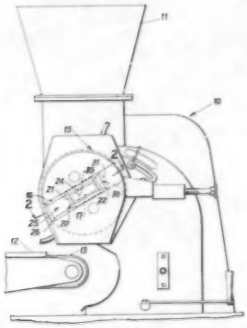
**4,391,576**

## ROTARY DRUM DOUGH DIVIDER

**Donald L. Cummins, Mechanicsville, Va., assignor to AMF Incorporated, White Plains, N.Y.**

**Filed Dec. 28, 1981, Ser. No. 334,766**
**Int. Cl.³ A21C *5/04*; B29C *1/00***
**U.S. Cl. 425—241** **11 Claims**



1. A piston assembly for a transverse through bore cylinder with diametrically opposed slots and a pair of ports each spaced outwardly from opposite ends of the slots in the drum of a rotary drum dough divider, comprising:

a sleeve removably fixed against movement relative a wall of said cylinder and equally spaced from the ends of said cylinder;

said sleeve having a pair of end walls engaging and forming with the wall of said cylinder a pair of axially spaced sealed interfaces each between opposite ends of the slots and a different one of the pair of ports;

a double ended piston having a rod extending through said sleeve and a head connected to each end of said rod to reciprocate in said cylinder between two terminal positions with one of said heads being flush with the surface of the drum in one terminal position and the other of said heads being flush with the surface of the drum in the other terminal position;

said piston rod being formed by two rod portions each being connected at one end to a different one of said heads; and

the adjacent ends of said rod portions being interfitted and connected together by means extending through said slots and being movable axially in said cylinder to reciprocate said piston.

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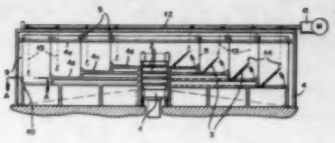
**4,391,577**

## INSTALLATIONS FOR THE HANDLING OF MOLDS ASSOCIATED WITH A TRANSFER PRESS

**Juan J. Molina Bonillo, Barcelona, Spain, assignor to G. Siempelkamp GmbH & Co., Krefeld, Fed. Rep. of Germany**

**Filed Feb. 8, 1982, Ser. No. 347,036**
**Claims priority, application Spain, Feb. 10, 1981, 499.281**
**Int. Cl.³ B29C *3/00***
**U.S. Cl. 425—338** **8 Claims**

1. An apparatus for the handling of the molds of a transfer type press having a plurality of levels comprising channels flanking said press at each level thereof for guiding the displacement of said molds into and out of said press for the stripping and loading of said molds at different distances from



said press, whereby the respective molds on any level are offset from the respective molds on any other level.

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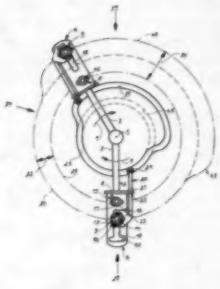
**4,391,578**

## MACHINE FOR THE PRODUCTION OF HOLLOW ARTICLES IN AT LEAST ONE MULTIPLE MOLD

**Lothar Schaar, Heuerssen, Fed. Rep. of Germany, assignor to Hermann Heye, Obernkirchen, Fed. Rep. of Germany**

**Continuation of Ser. No. 955,474, Oct. 26, 1978, abandoned, which is a division of Ser. No. 900,770, Apr. 27, 1978, abandoned. This application Sep. 8, 1980, Ser. No. 184,891**
**Claims priority, application Fed. Rep. of Germany, May 5, 1977, 2720129**
**Int. Cl.³ B29C *17/07*; C03B *9/193***
**U.S. Cl. 425—525** **1 Claim**



1. In a multiple neck mold machine having a pressing station in which a gob of plastic material fed to each neck mold is transformed into a parison carried by the respective neck mold, and also a finish forming station in which each parison is formed into a hollow article of larger diameter than the parison, a combination comprising an elongated carrier; a first neck mold mounted in a stationary position on said carrier; a second neck mold mounted on said carrier and movable in longitudinal direction of the latter relative to said stationary neck mold; means for moving said carrier along a predetermined path between said pressing station and said finish forming station; means cooperating with said movable neck mold for automatically increasing the center distance between said neck molds in dependence on the movement of said carrier from said pressing to said finish forming station; said center distance increasing means including stationary cam track means and cam follower means engaged in said cam track means and connected to said movable neck mold; and wherein said means for moving said carrier along said predetermined path comprises an arm connected at one end to said carrier and being turnable at the other end about a fixed axis normal to said arm so as to move said carrier along a circular path, said cam track means being located radially inwardly of said circular path and having a first portion concentric with said axis and a second portion likewise concentric with said axis but of a different radius than said first portion, and connected at opposite ends to said first portion, said center distance increasing

means including an operating rod connecting said cam follower with said movable neck mold.

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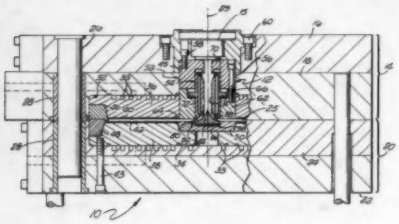
**4,391,579**

## HOT SPRUE VALVE ASSEMBLY FOR AN INJECTION MOLDING MACHINE

**Rocky V. Morrison, Redondo Beach, Calif., assignor to Discovision Associates, Costa Mesa, Calif.**

**Filed Sep. 23, 1981, Ser. No. 304,421**
**Int. Cl.³ B29D *17/00***
**U.S. Cl. 425—548** **7 Claims**



1. A mold assembly for an injection molding machine, comprising:

first and second mold halves movable toward each other to a closed position defining a disc-shaped mold cavity, and movable away from each other to an open position allowing a molded disc to be removed from said mold cavity;

a valve body mounted on said first mold half and having a central opening formed therein;

a valve member carried within the central opening for sliding movement toward and away from the mold cavity, said valve member including a sprue bushing having a central bore formed therein for passage of the material toward the mold cavity, and a dispersion head cooperating with said sprue bushing for defining an annular and radially outwardly open gate passage for flow of material from the bore into the mold cavity;

means for controlling movement of said valve member between a first position with said dispersion head advanced at least partially through the mold cavity and said gate passage aligned with the mold cavity for flow of the material into the mold cavity when said first and second mold halves are in said closed position, and a second position with said gate passage retracted from alignment with the mold cavity and said dispersion head positioned generally within the mold cavity to mold a central aperture into the disc prior to solidification of the material within the mold cavity while said first and second mold halves are still in said closed position; and

means defining a recess formed in said second mold half for receiving said dispersion head when said valve member is in said second position.

6. In an injection molding machine for producing centrally apertured record discs, a valve assembly for controlling flow of molten disc-forming material into a disc-shaped mold cavity, comprising:

first and second mold halves movable toward each other to define the mold cavity and movable away from each other to allow a disc to be removed from the mold cavity;

a valve body secured to said first mold half and having a central opening formed therein;

a valve member carried within the central opening for sliding movement toward and away from the mold cavity, said valve member including a sprue bushing having a central bore formed therein for passage of the material toward the mold cavity, and a dispersion head cooperating with said sprue bushing for defining an annular and radially outwardly open gate passage for flow of material from the bore into the mold cavity;

means for controlling movement of said valve member between a first position with said dispersion head advanced at least partially through the mold cavity and said gate passage aligned with the mold cavity for flow of the material into the mold cavity, and a second position with said gate passage retracted from alignment with the mold cavity and said dispersion head positioned generally within the mold cavity to mold a central aperture into the disc prior to solidification of the material within the mold cavity; and

said second mold half including means for receiving said dispersion head when said valve member is in said second position.

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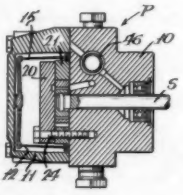
**4,391,580**

## LIQUID FUEL SUPPLY SYSTEM FOR AN ATOMIZATION BURNER NOZZLE

**Dale L. Hunsberger, and Frank L. Harwath, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Dec. 8, 1980, Ser. No. 213,923**
**Int. Cl.³ F23C *11/00*; F04C *29/08***
**U.S. Cl. 431—1** **15 Claims**



1. A liquid fuel supply system for an atomization burner having a nozzle comprising, a fuel pump having a pair of rotatable gears for pumping fuel from a pump inlet port to a pressure port with a pressure pulse created each time a tooth of one gear makes full penetration into the space between a pair of teeth on the other gear, a passage in said pump, a fluid outlet from the pump connected to said passage and adapted for connection to said nozzle, and means for pulsing fluid flow to the nozzle by alternately connecting said passage to said pressure port at the time of a pressure pulse and to the fuel pump inlet port with the pressure peak of the pulsed flow being phased together with said pressure pulse.

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**4,391,581**

## FLUID COOLED BURNER STRUCTURE

**Lloyd W. Daman, Pemberville, and Donald E. Shamp, Millbury, both of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio**

**Filed Dec. 8, 1980, Ser. No. 214,350**
**Int. Cl.³ F23D *11/36***
**U.S. Cl. 431—160** **4 Claims**

1. A fuel burner adapted to extend through an opening in a wall of the tunnel connecting a port with the checkers of a regenerative-type glass melting furnace comprising:

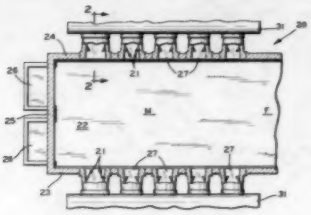
a. an elongated fuel supply tube having an open angled end portion for emitting fuel therefrom;

b. a tubular jacket concentrically surrounding a portion of said fuel supply tube and extending from said angled end portion;

c. first and second closure members for closing the ends of the space between the fuel supply tube and said jacket for forming a chamber therebetween, said first closure member having a first planar portion with an aperture therein aligned with the open angled end of said fuel supply tube and extending perpendicularly thereto and a second pla-

nar portion extending perpendicular to a portion of said tubular jacket;

d. a pair of longitudinal vanes oppositely disposed within the space between said fuel supply tube and said jacket and



extending from said second closure member to a point adjacent to but spaced from said first closure member; and

e. means for circulating a coolant within the chamber of said jacket.

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**4,391,582**

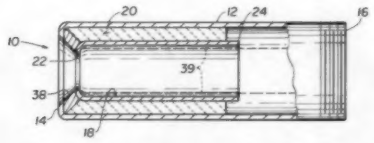
**FUEL NOZZLE WITH CONCENTRIC IGNITOR**

**Frederick C. Cowan, 82 Cove Rd., Oyster Bay Cove, N.Y. 11771**

**Filed Mar. 30, 1981, Ser. No. 248,909**

**Int. Cl.³ F23Q *3/00***

**U.S. Cl. 431—266** **12 Claims**



1. A power arc ignitor comprising:

a fuel nozzle, said nozzle being constructed from concentric metal tubes spaced by a ceramic insulator body;

a means to terminate the insulator body with a semi-conductive surface to provide a conductive path across an end of the insulator body from an outer one of the tubes to an inner one of the tubes;

means to deliver fuel to the inner one of said tubes to flow therethrough; and

means to controllably connect a high energy positive potential to the inner tube and a ground potential to the outer one of the tubes to originate an electrical arc pulsation from the inner to the outer of said concentric tubes across said conductive path at the end of the insulator body.

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**4,391,583**

**PROCESS OF THERMALLY TREATING BULK MATERIALS IN A ROTARY KILN**

**Harry Serbent, Hanau; Detlev Schlebusch, Wöllstadt; Gerhard Reuter, München-Aschheim, and Wolfram Schnabel, Idstein, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

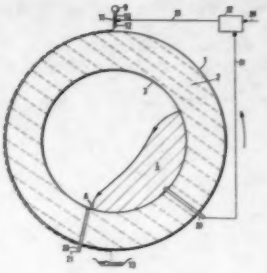
**Filed Oct. 13, 1981, Ser. No. 310,953**

**Claims priority, application Fed. Rep. of Germany, Oct. 17, 1980, 3039212**

**Int. Cl.³ F27D *7/00, 23/00;* F27B *7/38***

**U.S. Cl. 432—4** **12 Claims**

1. In a process of thermally treating bulk material with hot gases in a rotary kiln below the melting point of the charge components in the rotary kiln while cooling the shell and refractory lining of the kiln, the improvement which comprises cooling several sections of the rotary kiln in which the charge is at about the highest permissible temperature in regard to the formation of crusts if the temperature of the charge rises further in contact with the hot inner surface, by a cooling medium and adjusting the temperature of the inside surface of the kiln



at the point where it becomes submerged below the charge in said region so that it is at or up to 50° C. below the temperature of the charge in said regions thereby controllably dissipating heat through the lining of the kiln to said cooling medium.

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**4,391,584**

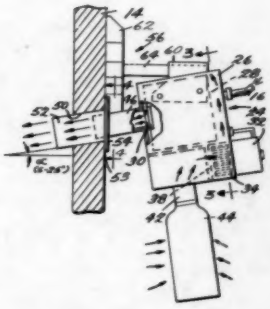
**NON-CONTACT INFRARED FABRIC TEMPERATURE MONITORING**

**Vernon T. Daniel, Oak Ridge, N.C., assignor to Burlington Industries, Inc., Greensboro, N.C.**

**Filed Sep. 11, 1981, Ser. No. 301,438**

**Int. Cl.³ F27B *9/28, 9/40;* F27D *19/00;* G01D *11/24***

**U.S. Cl. 432—8** **12 Claims**



1. A method of determining textile web temperatures in a textile web treating oven utilizing an infrared pyrometer, comprising the steps of:

passing an open textile web in a first generally horizontal direction through a textile oven, the web being disposed substantially in a horizontal plane;

providing an opening in the textile oven passing from the exterior into the interior thereof, and adjacent an area wherein the web passes through the oven;

mounting an infrared pyrometer so that it is in operative association with the oven opening and so that the pyrometer is disposed at a viewing angle of between about 5°–25° with respect to the horizontal; and

determining textile web temperatures with the pyrometer.

4,391,585

## METHOD OF OPERATING A CONTINUOUS CERAMIC KILN

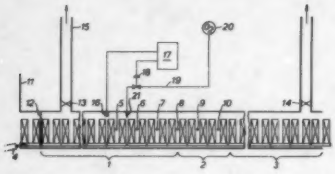
Eric K. Riley, Wombourne; Colin D. Smith, Alsager; Garry J. Yates, Knutsford, and Norris W. Shepherd, Worksop, all of England, assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Mar. 20, 1981, Ser. No. 245,811

Claims priority, application United Kingdom, Mar. 26, 1980, 8010147

Int. Cl.³ F27B 9/04, 9/40; F26B 3/00

U.S. Cl. 432—23 6 Claims



1. A method of decarbonizing shaped ceramic articles in an intermittent push continuous ceramic kiln having a heating and decarbonizing zone, a firing zone and a cooling zone fitted with means to sense the concentration of oxygen in the decarbonizing zone, said means associated with a control fitted to oxygen or oxygen enriched air injection means associated with said decarbonizing zone comprising the steps of:

progressively heating said shaped ceramic articles to about 900° C. in the decarbonizing zone to oxidize organic matter contained in the articles;

maintaining the oxygen concentration of the decarbonization zone at a minimum level of 7.5% by volume between pushes as determined by the equation:

$$C = \frac{R_2}{R_1} A(1 + X)$$

where

C is the predetermined level at a point in the decarbonization zone;

$R_1$ is the throughput of clayware articles during satisfactory operation of the kiln without oxygen addition;

A is the average oxygen concentration at said point during satisfactory operation of the kiln without oxygen addition at throughput rate $R_1$;

$R_2$ is the new throughput of clayware articles; and

X is between the limits of $\geqq 0$ and $\leqq 0.5$,

by adding oxygen or oxygen enriched air to the decarbonization zone;

continuing heating of said shaped ceramic articles until firing is completed; and

cooling said shaped ceramic articles to ambient temperature.

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4,391,586

## TWO STAGE FLUID BED REGENERATOR

George N. Brown, Lexington, Va., assignor to Westvaco Corporation, New York, N.Y.

Division of Ser. No. 199,583, Oct. 22, 1980, Pat. No. 4,338,198. This application Nov. 12, 1981, Ser. No. 320,308

Int. Cl.³ F27B 15/00; F23B 5/02

U.S. Cl. 432—58 7 Claims

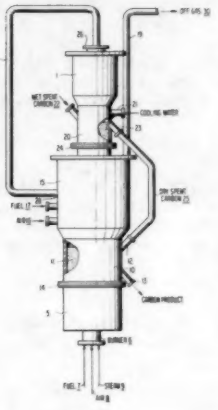
1. A vertically elongated vessel for the regeneration of wet spent carbon comprising:

(a) a combustion chamber located at the bottom portion of the vessel, the combustion chamber having a burner with fuel and air inlet means associated therewith;

(b) a regeneration zone superimposed over the combustion chamber and separated therefrom by gas distribution plate means for maintenance of a fluidized bed within the regeneration zone, the regeneration zone having a dried carbon inlet means and means for withdrawing regenerated carbon therefrom;

(c) a drying zone located at the top portion of the elongated vessel, the drying zone having means for introducing wet spent carbon therein, dried carbon outlet means and outlet means for passing a drying zone off gas out from the vertically elongated vessel;

(d) an incineration zone interposed between the regeneration zone and the drying zone with inlet means for introducing the drying zone off gas and outlet means for discharging incineration zone gaseous effluent, the incineration zone being circumscribed by the inner wall of a segment of the



elongated vessel, and the incineration zone being contiguous and in open communication with the regeneration zone whereby heat is radiated to the fluidized bed within the regeneration zone;

(e) gas distribution means located between the incineration zone and the drying zone for maintenance of a fluidized bed within the drying zone;

(f) dry carbon transfer means connecting the dried carbon outlet means and the dried carbon inlet means of the regeneration zone; and

(g) off gas transfer means connecting the drying zone off gas outlet means and the incineration zone inlet means for introducing the drying zone off gas into the incineration zone.

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4,391,587

## SLAB HEATING FURNACE

Tadashi Murakami, and Toshikatsu Kishida, both of Himeji, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

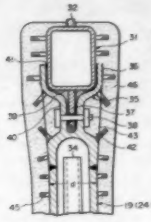
Continuation of Ser. No. 134,577, Mar. 27, 1980, abandoned. This application Jan. 19, 1982, Ser. No. 340,673

Int. Cl.³ F27B 9/00; F27D 3/00

U.S. Cl. 432—121 5 Claims

1. In a heating furnace, the combination of water cooled tubular skid beams, water cooled posts for supporting said water cooled skid beams, and a post head on the upper end of each supporting post and having a trough-shaped receiving

portion receiving a skid beam therein, said trough-shaped receiving portion having a length in the direction of the length



of the supported skid beam from two to five times the outer diameter of said water cooled posts.

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**4,391,588**

## DENTAL TREATMENT CHAIR

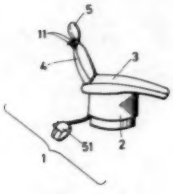
**Takahiro Matsui, Uji, Japan, assignor to Kabushiki Kaisha Morita Seisakusho, Kyoto, Japan**

**Filed Oct. 30, 1981, Ser. No. 316,824**

**Claims priority, application Japan, Nov. 7, 1980, 55-160159[U]**

**Int. Cl.³ A61G *15/00*; A61C *1/14***

**U.S. Cl. 433—33** **1 Claim**



1. A dental treatment chair having a backrest reclinably mounted on the seat body supported on a base, said backrest incorporating therein reeling means for flexible connecting pipes connected to the instruments of said chair, said chair characterized in that:

said backrest contains therein a dispensing controller for compressed air and water to be supplied to each of said instruments, said dispensing controller comprising:

a distributing block for said compressed air and water;

a manometer coupled to said compressed air; and

air-pressure-operated valves for turning ON and OFF the compressed air and water, said air-pressure-operated valve being disposed between said distributing block for compressed air and water and said flexible pipes for said instruments;

at least one of said air-pressure-operated valves is a distributing valve for said compressed air and water;

a plurality of couplings disposed in proximity to said reeling means for connecting a base end portion of said flexible pipes to a compressed air and water supply side of said dispensing controller;

a throttle valve for controlling a flow rate of said compressed air and water provided in at least one of said couplings; and

a plurality of air passageways branched off and connected and one water passageway connected to the respective supply sources of compressed air and water are bundled by one flexible pipe and introduced from said seat body side into said backrest.

**4,391,589**

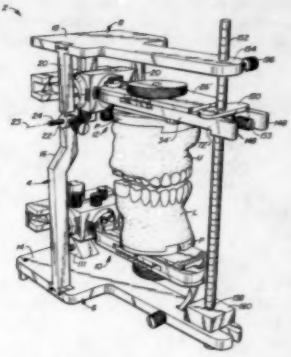
## SURGICAL DENTAL ARTICULATOR

**Joseph R. Moufredo, San Diego, and Ronald H. Roth, San Mateo, both of Calif., assignors to Johnson & Johnson Dental Products Company, New Brunswick, N.J.**

**Filed Jul. 27, 1981, Ser. No. 286,449**

**Int. Cl.³ A61C *11/00***

**U.S. Cl. 433—63** **8 Claims**



1. A surgical dental articulator for manipulating a set of dental casts, each said dental cast mounted to a mounting plate, comprising:

a frame having frame sections hingedly attached along a hinge axis, said hinge axis corresponding to the terminal hinge axis of a patient; and

a pair of means for mounting one said mounting plate and dental cast therewith to each of said frame sections, said mounting means including:

means for individually and measurably translating said dental casts parallel to three separate, nominally orthogonal paths, said translating means including linear graduated scales so that individual distances translated along said three paths can be read directly;

means for individually and measureably pivoting said dental casts about three separate, nominally orthogonal pivot axes, said pivoting means including angular graduated scales so that individual angles pivoted about said three pivot axes can be read directly; and

a first support rigidly mounted to one of said frame sections and along which a second support mounted perpendicular to said first support moves along a first path of said three paths to carry one said dental cast parallel to said first path, said second support defining a second path of said three paths for movement of one said dental cast parallel to said second path;

whereby the dental casts can be individually and measureably translated along three separate linear paths and pivoted around three separate rotational axes.

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**4,391,590**

## CARTRIDGE FOR VISCOUS MATERIAL

**Emery W. Dougherty, York, Pa., assignor to Dentsply Research & Development Corp., Milford, Del.**

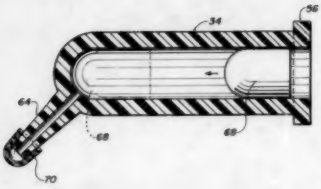
**Continuation-in-part of Ser. No. 252,558, Apr. 9, 1981, Pat. No. 4,330,280. This application Jan. 29, 1982, Ser. No. 344,255**

**Int. Cl.³ A61C *5/04***

**U.S. Cl. 433—90** **2 Claims**

1. A miniature capsule-like cartridge adapted to be operated solely by being mounted upon an ejector-type holder and comprising in combination, a hollow elongated uniformly cylindrical body of predetermined length and uniform diameter interiorly and exteriorly and molded from rigid plastic material, one end of said body being open and formed at the

extremity thereof with an annular relatively short circular exterior flange of limited width and adapted to be detachably mounted within a complementary seat in an ejector type holder, the opposite end of said body being closed by a hemispherical wall of substantially the same uniform thickness as said body, a discharge nipple of the same material as the body and molded integrally therewith and extending from said closed end of said body at an angle to the axis of said body to facilitate directing discharge from the cartridge to the interior of an oral cavity, a piston having sidewalls closely complementary to the inner walls of said body and inserted into the open end thereof to form a combination closure and ejecting means



for material when contained in said cartridge, the inner end of said piston being hemispherical and complementary in shape to the interior surface of the closed end of said body to effect ejection of substantially the entire contents of said cartridge when said piston is fully inserted into said body of the cartridge, sealing means comprising a cup-shaped cap removably connected to the outer end of the discharge nipple on said body to close said outer end of the nipple to seal the contents of the cartridge against ingress of ambient atmosphere and/or any surrounding contaminating matter, and said cap being color-coded to indicate desired properties of the contents of the cartridge.

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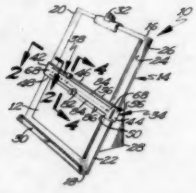
**4,391,591**

## COMBINED PATTERN HOLDER AND PATTERN POSITION INDICATOR

**Manny C. Hamburger, 2233 Oregon Ct., St. Louis Park, Minn. 55426**

**Continuation of Ser. No. 88,795, Oct. 29, 1979, Pat. No. 4,302,192. This application Nov. 16, 1981, Ser. No. 321,980**
**The portion of the term of this patent subsequent to Nov. 24, 1998, has been disclaimed.**
**Int. Cl.³ G09B *19/20***
**U.S. Cl. 434—95** **6 Claims**



1. A device for simultaneously holding a pattern to be followed and indicating pattern information, with the pattern to be followed including several rows, with each of the rows including a plurality of instructions for performing various stitches, comprising, in combination: a pattern support member including a top edge, a bottom edge, a first side edge, a second side edge, a pattern support face, and a back face, with the pattern support face allowing the support of the pattern to be followed thereon; means for holding the pattern to be followed on the pattern support face of the pattern support member; and notation means for simultaneously delineating and also for visually summarizing the pattern position in the pattern to be followed at a single visual location, with the notation means comprising, in combination: means for visually highlighting the row of the pattern to be followed and means located on the visually highlighting means for indicating the position of the pattern to be followed, with the visually highlighting means being movable upon the pattern support face of the pattern support member in a direction generally parallel to the side edges and between the top and bottom edges, wherein the visually highlighting means comprises an elongated bar member having a first end, a second end, a top edge, a bottom edge, a first face, and a second face, wherein the pattern position indicating means comprises, in combination: a series of pattern positions located on the first face of the elongated bar member; a first indicator; a second indicator; means for independently operating the first and second indicators allowing the first and second indicators to indicate the same pattern position at the same time in the series of pattern positions or different pattern positions at the same time in the series of pattern positions and allowing the first and second indicators to be moved from any pattern position to any other pattern position without interfering with or requiring movement of the other indicator, with the independently operating means comprising: means located on and cooperating with the elongated member for positioning the first indicator adjacent the top edge of the elongated member for indicating the desired pattern position in the series of pattern positions, and means located on and cooperating with the elongated bar member for positioning the second indicator adjacent the bottom edge of the elongated member for indicating the desired pattern position in the series of pattern positions.

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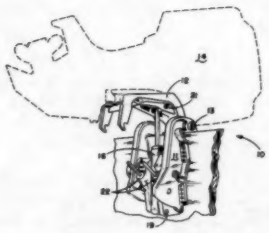
**4,391,592**

## HYDRAULIC TRIM-TILT SYSTEM

**James M. Hundertmark, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.**

**Filed Sep. 29, 1980, Ser. No. 191,733**
**Int. Cl.³ F15B *15/22***
**U.S. Cl. 440—61** **7 Claims**



1. A hydraulic system for trimming and tilting an outboard propulsion unit pivotally mounted on a support member for mounting on a boat, said hydraulic system comprising:

(A) a first extensible hydraulic piston-cylinder unit pivotally connected to said propulsion unit and to said support member;

(B) a second extensible hydraulic piston-cylinder unit connected to one of said propulsion unit and said support member and having an extensible part engaging the other of said propulsion unit and said support member, said second piston-cylinder unit including a cylinder having closed ends, a piston reciprocably mounted in said cylinder, and a piston rod connected to said piston and extending through one of said closed ends;

(C) a hydraulic pump;

(D) a conduit means hydraulically connecting said first and second hydraulic piston-cylinder units to said hydraulic pump to supply said first and second hydraulic piston-cylinder unit with hydraulic fluid; and

(E) a pressure relief means to limit the maximum pressure of

the hydraulic fluid supplied to said first piston-cylinder unit only when said second piston-cylinder unit has extended a predetermined amount, said pressure relief means including a relief valve through said piston and a pilot operated check valve to prevent flow through said relief valve except when said second piston-cylinder unit has extended said predetermined amount.

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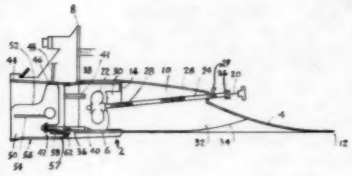
**4,391,593**

## PROPULSION DRIVE SYSTEMS

**Edward Whitworth, R.R. #3, Port Rowan, Ontario, Canada**

**Filed Oct. 10, 1979, Ser. No. 83,458**
**Int. Cl.³ B63H *1/14***
**U.S. Cl. 440—70** **13 Claims**



1. A propulsion drive system for a boat comprising:
(a) a tunnel inset into the bottom of said boat commencing at the stern and extending a relatively short distance towards the bow, said tunnel being cylindrical in shape;
(b) a channel in the bottom of said boat extending in front of said tunnel and gradually decreasing in size towards the bow until the channel disappears completely, said channel being open towards the bottom of the boat and having a cross-sectional area slightly larger than the outside diameter of the tunnel where the tunnel and the channel meet, said tunnel having a circular leading edge that is tapered throughout its circumference from an inner wall to an outer wall of said tunnel to allow for a smooth transition between the channel and the tunnel;
(c) a shaft extending from a motor in said boat to a propeller centred widthwise in said tunnel near said stern, said propeller having a small diameter relative to the size of said tunnel, said shaft being enclosed in a suitable log;
(d) means for mounting said log within the tunnel to maintain the propeller in the centre;
(e) a converging nozzle mounted along the rear of a trailing edge of said tunnel;
(f) a suitable rudder mounted to the rear of said converging nozzle;
(g) said log containing water cooled bearings and holes or water passages in front of each of said bearings so that water from the location where the boat is being operated can come into contact with said bearings;
(h) appropriate passages so that the motor is cooled from water passing through said holes in said log.

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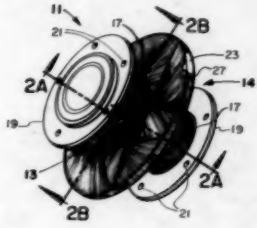
**4,391,594**

## FLEXIBLE COUPLING

**Alan J. Hannibal, and Charles H. Parr, both of Fairview, Pa., assignors to Lord Corporation, Erie, Pa.**

**Filed Aug. 25, 1980, Ser. No. 181,260**
**Int. Cl.³ F16D *3/56***
**U.S. Cl. 464—80** **4 Claims**

1. A coupling for transmitting torque and accommodating misalignment between a drive member and a driven member, said coupling having a central axis, comprising:
a pair of rigid hubs encircling said axis at spaced locations along the length thereof, one of said hubs being connectable to said drive member and the other of said hubs being connectable to said driven member, each of said hubs having a nonaxisymmetrical shaft extending toward and spaced from the other of said hubs;
a reinforcing ring encircling said axis at a location along the length thereof intermediate said hubs;
an elongated tubular connecting member encircling said axis and extending between said hubs, said connecting member having relatively small diameter opposite end portions and a relatively large diameter diaphragm portion disposed therebetween;
said end portions of said connecting member being formed in situ upon and overlying at least a major portion of the length of respective ones of said hub shafts, and being permanently anchored thereto;
said diaphragm portion of said connecting member being formed in situ about said reinforcing ring and having opposite sides extending closely adjacent thereto in substantially perpendicular relationship to said axis and in substantially parallel relationship to each other;




said portions of said connecting member being formed integrally with each other from, and being defined by, high-strength nonwoven filaments coated or impregnated with matrix material and each passing repeatedly along substantially the entire length of said connecting member;
each of said filaments during each pass thereof along the length of said connecting member having an end-portion defining section extending completely about the circumference of one of said hub shafts, and a diaphragm-portion defining section extending along a geodesic path between said hub shafts and about the periphery of said reinforcing ring, and another end-portion defining section extending completely about the circumference of the other of said hub shafts, whereby said connecting member immediately resists rotation of said hubs relative to each other upon rotation of either of said hubs;
said matrix material associated with said diaphragm-portion sections of said filaments being flexible to permit misalignment-accommodation flexure of said diaphragm portion during use of said coupling.

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**4,391,595**

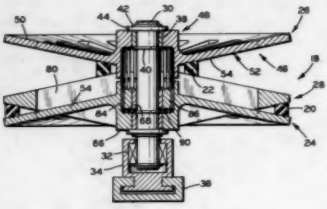
## VARIABLE SPEED, MULTIPLE COMPONENT PULLEY

**Thomas D. Wood; Garry K. Reiss, both of Mt. Vernon, and Larry L. Overly, Fredericktown, all of Ohio, assignors to The J. B. Foote Foundry Co., Fredericktown, Ohio**

**Filed Feb. 18, 1982, Ser. No. 350,002**
**Int. Cl.³ F16H *55/52***
**U.S. Cl. 474—33** **16 Claims**

10. A variable speed pulley comprising a shaft, a first outer pulley component rotatably mounted on said shaft in a substantially fixed position axially of said shaft, a second, outer pulley component rotatably mounted on said shaft in spaced relationship with respect to said first component and in a substantially fixed position axially of said shaft, and a third, intermediate pulley component mounted on said shaft between said outer pulley components, said third pulley component being slidably and rotatably mounted on said shaft between said outer pulley components, each of said outer pulley components having a truncated, conical portion and a central hub portion extending

outwardly away from the other outer component, each of said conical portions having an outer rim and a plurality of generally radially-extending tines extending from said rim to said hub portion, said tines forming generally radially-extending slots therebetween in said conical portion and having extensions extending in spaced relationship toward the other outer pulley component, said third pulley component having a shallow truncated conical portion extending in opposite directions and a central hub portion, said conical portion of said third component having an outer rim and a plurality of generally radially-extending tines extending from said rim of said third



component to said central hub portion of said third component, said tines of said third component forming generally radially-extending slots therebetween in said conical portion of said third component, said slots of said outer components being wider than corresponding portions of said radially-extending tines of said third component, said tines of said third component being received in said slots of said outer components when said third component is moved into fully inter-nesting positions with respect to said outer components, and said tines of said third component cooperating with said extensions of said outer components to cause said three components to rotate together for all positions of said third component on said shaft.

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**4,391,596**

**FOLDER**

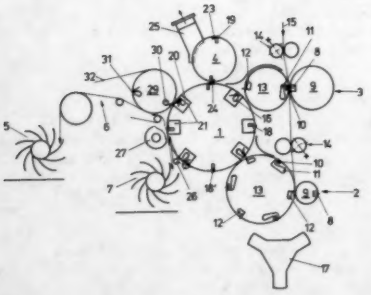
**Rudolf Fischer, Ludwigshafen-Oggersheim, Fed. Rep. of Germany, assignor to Albert-Frankenthal AG, Frankenthal, Fed. Rep. of Germany**

**Filed Jul. 30, 1981, Ser. No. 288,349**

**Claims priority, application Fed. Rep. of Germany, Aug. 14, 1980, 3030706**

**Int. Cl.³ B65H *45/16***

**U.S. Cl. 493—425** **9 Claims**



**1.** In a folder adapted for two different cutting formats, one format cutting sheets of one half plate cylinder circumference and the second format cutting sheets of full plate cylinder circumference, said folder comprising a fold jaw cylinder, at least two transverse paper cutters circumferentially spaced about said folding jaw cylinder and located in a transverse paper cutting station, each transverse cutter including a folding blade cylinder having at least one folding blade, each folding blade cylinder being adapted to cooperate with said fold jaw cylinder to fold a sheet cut from a web by one of said paper cutters and for forwarding the sheets to a delivery station, means for making one of said transverse paper cutters active one at a time, said fold jaw cylinder having tool support points circumferentially disposed in equal spaced apart relationship corresponding to one half the smallest paper size to be cut, fold jaws removably positioned in certain of said tool support points cooperating with the folding blades of the active transverse cutter, spaced-apart scissor cutting blades for cutting a paper web into cut sheets some of which are removably positioned in tool support points alternating with said fold jaws, said scissor cutting blades running radially outwardly from said fold jaw cylinder, and a knife cylinder for cutting said paper web in cooperation with said scissor cutting blades of said fold jaw cylinder to provide a smooth cut to said cut sheets, said knife cylinder being disposed between said transverse paper cutting station and said delivery station, the circumference of said paper knife cylinder being equal to at least the greatest paper size to which said web is to be cut, said knife cylinder being adapted to have removably positioned thereon, with the same spacing of said scissor cutting blades of said fold jaw cylinder, further scissor cutting blades for use in cooperation with said scissor cutting blades of said fold jaw cylinder, whereby the removable fold jaws and scissor cutting blades of the fold jaw cylinder and the removable scissor cutting blades of the knife cylinder are removed or installed to cooperate with the active transverse paper cutter.

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**4,391,597**

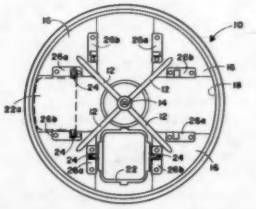
**HANGER FOR CENTRIFUGE BUCKETS**

**Alireza Piramoon, Santa Clara, and Rebecca J. Woodruff, San Mateo, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.**

**Continuation of Ser. No. 277,800, Jun. 29, 1981, abandoned. This application Jul. 21, 1982, Ser. No. 400,528**

**Int. Cl.³ B04B *9/12***

**U.S. Cl. 494—20** **1 Claim**



**1.** In a centrifuge rotor having an axis of rotation, a circumferential wall, a plurality of spaced arms radiating from said axis of rotation and supporting said circumferential wall, a plurality of buckets mounted one between each arm of said rotor, each said bucket having two outwardly extending pivot pins on a common axis, said pivot pins each engaging a hanger mounted on said rotor, said hanger comprising:

an elongated housing having mounting holes;

said housing having an opening transverse of its longitudinal axis for receiving a pivot pin of a bucket;

said housing having a longitudinal bore intersecting said opening;

said longitudinal bore having a counterbore forming a shoulder in said longitudinal bore;

a plunger slidably disposed in said longitudinal bore;

a spring disposed in said longitudinal bore, said spring acting on said plunger and urging said plunger in the direction of said opening for receiving said pivot pin;

said plunger having a flange, said flange abutting said shoul-

der of said longitudinal bore when said plunger is at the extreme end of its sliding travel, thereby retaining said plunger captive in said longitudinal bore;

said plunger exerting a clamping force on said pivot pin when said rotor is at rest preventing said bucket from rocking when being loaded or unloaded, but not preventing said bucket from pivoting to a horizontal position when said rotor is rotating, and not preventing said bucket from resuming a vertical position when said rotor is stopped;

an elongated slot intersecting said opening of said hanger at right angles, said pivot pin movable in said slot when centrifugal force acting on said bucket and said pin overcomes said clamping force, and movement of said bucket and said pin resulting in said bucket being extended radially outward and engaging said circumferential wall of said rotor.

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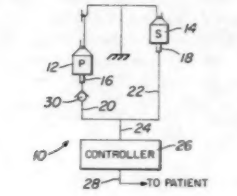
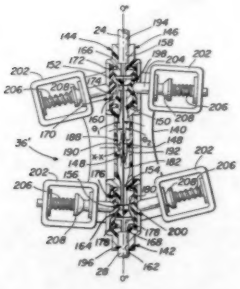
**4,391,598**

## INTRAVENOUS DRUG ADDITIVE DELIVERY SYSTEM WITH ELECTRONIC CONTROL

**Thomas C. Thompson, McKinney, Tex., assignor to Quest Medical, Inc., Carrollton, Tex.**

**Filed Apr. 28, 1981, Ser. No. 258,361**
**Int. Cl.³ A61M 5/00**
**U.S. Cl. 604—65** **21 Claims**



1. An apparatus for intravenous addition of a primary and secondary fluid to a patient comprising:

a primary container for holding the primary fluid;

a secondary container for holding the secondary fluid, the fluid in said secondary container being elevated above the fluid in said primary container;

primary and secondary fluid delivery lines extending from said primary and secondary containers, respectively;

a connector for combining the flow from said primary and secondary fluid delivery lines;

check valve means for permitting the secondary fluid to flow through the connector until the secondary container is empty and subsequently permitting the primary fluid to flow through the connector; controller means for controlling fluid flow to the patient, said connector directing the fluid flowing therethrough from said primary and secondary delivery lines into said controller means, said controller means including:

metering means for initially metering flow therethrough to the patient at a preselected flow rate representing the desired infusion rate of the secondary fluid;

sensing means for sensing the passage of a predetermined quantity of fluid equal to the quantity of secondary fluid which is to be infused;

said metering means subsequently metering flow therethrough at a second preselected flow rate representing the desired infusion rate of the primary fluid to the patient; and

a combined fluid delivery line extending from said controller means to the patient for transferring the fluid metered through said controller means to the patient for infusion.

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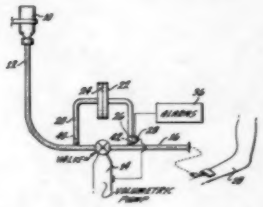
**4,391,599**

## APPARATUS FOR PROVIDING A CONTROLLED FLOW OF INTRAVENOUS FLUID TO A PATIENT

**Jon A. Jenkins, Rancho Santa Fe, Calif., assignor to IMED Corporation, San Diego, Calif.**

**Continuation of Ser. No. 4,464, Jan. 18, 1979, abandoned. This application Jun. 16, 1981, Ser. No. 274,154**
**Int. Cl.³ A61M 5/00**
**U.S. Cl. 604—118** **16 Claims**




1. In combination for introducing fluid to a patient,

flow lines for providing a flow of fluid on a gravitational basis, the flow lines including an input line and an output line,

implementing means having an input for receiving fluid from the input flow line and having an output for directing fluid into the output flow line and disposed between the input and output flow lines and constructed and operative to pump fluid through the input and output flow lines,

means disposed in a parallel relationship with the implementing means between the input and output lines and including means for establishing a fluid-isolated relationship between the input and the output of the implementing means and for alleviating the pressure in the output line,

means associated with the flow lines and operatively associated with the parallel means at the end of the parallel means communicating with output line for sensing an obstruction at a relatively low pressure in the output line in accordance with the pressure of the fluid in the output line, and

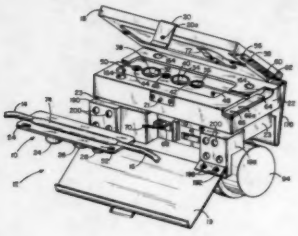
means responsive to the sensing means for discontinuing the operation of the implementing means when the sensing means senses an obstruction at a relatively low pressure in the output flow line.

4,391,600

# NONPULSATING IV PUMP AND DISPOSABLE PUMP CHAMBER

G. Kent Archibald, St. Paul, Minn., assignor to AVI, Inc., St. Paul, Minn.

Division of Ser. No. 19,223, Mar. 9, 1979, Pat. No. 4,236,880.
This application Sep. 15, 1980, Ser. No. 187,055
The portion of the term of this patent subsequent to Dec. 2, 1997, has been disclaimed.
Int. Cl.[3] A61M 5/00
U.S. Cl. 604—153 6 Claims



1. A volumetric infusion pump for pumping fluid from a source to a patient comprising:

a pump inlet for receiving fluid from the source;

a pump outlet for supplying fluid under pressure to the patient;

a pump housing having first and second cylinders therein;

a first pumping chamber including the first cylinder, a first piston movable in the first cylinder, first flexible rolling diaphragm means between the first cylinder and the first piston, a first inlet, and a first outlet, the first pumping chamber having a variable volume depending upon the position of the first piston in the first cylinder;

a second pumping chamber including the second cylinder, a second piston movable in the second cylinder, second flexible rolling diaphragm means between the second cylinder and the second piston, a second inlet connected to the first outlet, and a second outlet connected to the pump outlet, the second pumping chamber having a variable volume depending upon the position of the second piston in the second cylinder;

first valve means supported by the pump housing for controlling fluid flow between the pump inlet and the first inlet;

second valve means supported by the pump housing for controlling the fluid flow between the first outlet and the second inlet;

drive means for causing motion of the first piston in the first cylinder and motion of the second piston in the second cylinder;

valve control means for controlling the first and second valve means such that one of the first and second valve means is closed at all times; and

wherein the first and second flexible diaphragm means, the pump inlet, and the pump outlet form an integral disposable pump chamber having a sealed main fluid flow passage between the pump inlet and the pump outlet, so that fluid is pumped from the pump inlet to the pump outlet without physically contacting the pump housing, the first and second cylinders, the first and second pistons, the first and second valve means, the drive means or the valve control means.

4,391,601

## WRITING PARCHMENT AND METHODS FOR THE PRODUCTION THEREOF

Shmuel Y. Herman, 65 Hapisga St. Bayit Vegan, Jerusalem, Israel

Filed Dec. 7, 1981, Ser. No. 328,070
Claims priority, application Israel, Dec. 26, 1980, 61809
Int. Cl.³ C14C 1/00
U.S. Cl. 8—94.15 8 Claims

1. Fine writing parchment made from the skins of turkeys.

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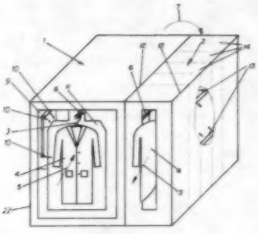
4,391,602

## PROCESS FOR SMOOTHING AND DRYING WASHED SHAPED ARTICLES OF MIXED FABRIC

Otto Stichnoth, and Andreas Stichnoth, both of Schiefer Weg 21, 3400 Gottingen, Fed. Rep. of Germany

Filed Sep. 23, 1980, Ser. No. 190,078
Claims priority, application Fed. Rep. of Germany, Oct. 2, 1979, 2939870
Int. Cl.³ D06B 3/30
U.S. Cl. 8—149.1 20 Claims



1. A process for smoothing shaped articles of mixed fabric having both synthetic and natural fibers, comprising the steps of:

(a) washing said articles at a first temperature;

(b) conveying said washed articles through a heating chamber until said articles are a temperature at least equal to said first temperature and substantially isothermal throughout;

wherein atmosphere within said heating chamber is maintained at a substantially uniform wet bulb temperature at least equal to said first temperature by introduction of steam and air therein;

(c) drying said heated washed articles by conveying said articles through a plurality serially disposed drying chamber sections and directing drying air at said articles within each of said drying chamber sections at sufficient velocity to agitate said articles and thereby tighten, smooth and dry said fabric by:

i. introducing a stream of drying air first into the drying chamber section lastly encountered by said articles upon conveying through said drying chamber sections and thereafter serially into said drying chamber sections in order reverse from that traversed by said articles during conveyance thereof through said drying chamber sections;

ii. heating said drying air intermediate each of said drying chamber sections of said plurality;

iii. introducing said stream of heated drying air leaving a drying chamber section which is first encountered by said articles during conveyance thereof through said serially disposed drying chamber sections into said heating chamber as high humidity heating air by discharging said stream of heated drying air through a steam environment into said heating chamber;

iv. discharging said high humidity heating air from said heating chamber

v. removing condensate from said high humidity heating air;

vi. cooling said high humidity heated thereby reducing relative humidity thereof to produce relatively dry cooler air;

vii. heating said relatively dry cooler air to produce heated relatively dry air for repeated serial passage through said drying chamber sections

wherein the steps of element c are performed repetitively and serially in the order recited.

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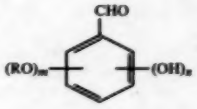
4,391,603

## HYDROXYL DERIVATIVES OF BENZALDEHYDE FOR COLORING KERATIN FIBRES IN THE ABSENCE OF OXIDIZING AGENT

Georges Rosenbaum, Asnieres; Jean F. Grollier, Paris, and Jean Cotteret, Franconville, all of France, assignors to L'Oreal, Paris, France

Filed Apr. 15, 1981, Ser. No. 254,514
Claims priority, application France, Apr. 17, 1980, 80 08645
Int. Cl.³ A61K 7/13
U.S. Cl. 8—424 17 Claims

1. Process for colouring keratin fibres in the absence of an oxidising agent, which comprises applying thereto at least one composition containing a cosmetically acceptable medium and a dyestuff corresponding to the formula:




(I)

in which R denotes a linear or branched lower alkyl group which is optionally substituted by one or two hydroxyl groups, n is equal to 1, 2 or 3, m is equal to 0, 1 or 2 such that n+m is equal to 2 or 3, with the proviso that (i) if m is equal to 0 (and n is equal to 2 or 3), the OH groups occupy the following positions of the ring:

| 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|
| | OH | OH | | |
| OH | | OH | | |
| | OH | | OH | |
| OH | OH | OH | | |
| OH | OH | | | OH |
| OH | OH | | OH | |
| OH | | OH | | OH |
| | OH | OH | OH | |
| OH | | | | OH |

and (ii) if m and n both denote 1, the substituents occupy the following positions of the rings:

| 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|
| OH | | | | OR |
| OR | OH | | | |
| | OH | OR | | |
| | OH | | OR | |
| OH | | | OR | |
| OH | $OCH_2CH_2OH$ | | | |
| | (3) | | | |
| OH | | | $OCH_2CHCH_2$ | |
| | | | OHOH | |
| | | | (5) | |
| OH | $OC_2H_5$ | | | |

or a bisulphite adduct thereof.

4,391,604

## PROCESS FOR DYEING TEXTILE FABRIC: MECHANICAL TREATMENT TO PROMOTE FOAMING IN FABRIC BEFORE STEAMING

Haas Schomakers, An den Gassenwiesen 4, 6415 Petersberg, Fed. Rep. of Germany

Filed Oct. 20, 1981, Ser. No. 313,353

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1980, 3039661

Int. Cl.³ D06B 1/08

U.S. Cl. 8—477 10 Claims

1. A process of dyeing textile fabrics comprising:

(a) wetting a fabric with an unfoamed dyeing solution containing foaming agents;

(b) exposing the wetted fabric to a mechanical treatment consisting of alternating compression and relief; and

(c) subjecting the wetted, mechanically treated fabric to a steaming treatment.

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4,391,605

## TEXTILE TREATMENT

Paul G. H. Bakker, Ilkley, England, assignor to Wool Development International Limited, London, England

Filed Aug. 7, 1981, Ser. No. 291,118

Claims priority, application United Kingdom, Aug. 7, 1980, 8025844

Int. Cl.³ D06M 13/18, 13/46

U.S. Cl. 8—495 13 Claims

1. A composition for treating textiles which comprises a quarternary ammonium salt containing a methyl group and three alkyl or aralkyl groups containing from eight to ten carbon atoms, and a water soluble polyether.

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4,391,606

## AZO POLYETHER DYESTUFFS, FORMULATIONS OF THESE DYESTUFFS, THEIR PREPARATION AND THEIR USE

Winfried Kruckenberg; Karl H. Schündehütte, both of Leverkusen, and Volker Hederich, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 90,374, Nov. 1, 1979, abandoned. This application Aug. 14, 1981, Ser. No. 292,860

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1978, 2850662

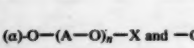
The portion of the term of this patent subsequent to Feb. 10, 1998, has been disclaimed.

Int. Cl.³ C09B 1/00

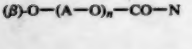
U.S. Cl. 8—525 16 Claims

1. Dyestuff formulation comprising

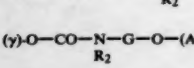
(a) an azo dyestuff which is free from sulphonic acid groups and ammonium groups and which contains at least one of



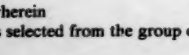
(α)-O—(A—O)$_n$—X and —O—CO—N($R_1$, $R_2$), or



(β)-O—(A—O)$_n$—CO—N($R_1$, $R_2$) or



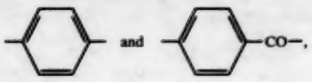
—(A—O)$_n$—CO—N($R_1$, $R_2$), or



(γ)-O—CO—N($R_2$)—G—O—(A—O)$_n$—X,

wherein

G is selected from the group consisting of $C_2$–$C_6$ alkylene,



and



A is $C_2$–$C_6$-alkylene,

X is selected from the group consisting of hydrogen, Y, —COY and —CONR$_1$R$_2$,

Y is selected from the group consisting of alkyl, cycloalkyl, aralkyl, aryl, and substituted alkyl, cycloalkyl, aralkyl and aryl,

$R_1$ is selected from the group consisting of hydrogen and Y,

$R_2$ is selected from the group consisting of hydrogen, alkyl and substituted alkyl, and

n is a number from 1 to 7 and n is at least 2 if X is —COY, and

(b) an emulsifying polar-nonpolar compound.

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4,391,607

## DYEING PROCESS AND PRINTING PROCESS USING REACTIVE DYESTUFFS

Dietrich Hildebrand, Odenthal, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 24, 1981, Ser. No. 276,863

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1980, 3027077

Int. Cl.³ C09B 62/00; D06P 1/38

U.S. Cl. 8—549 11 Claims

1. Process for dyeing or printing fibre materials with the aid of reactive dyestuffs which split off fluoride ions, characterised in that neutral or acid dyebaths or printing pastes which contain, in addition to the reactive dyestuff and customary auxiliaries and solvents, one or more organic and/or inorganic calcium compounds are employed said calcium compounds being soluble in water or being sparingly soluble in water.

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4,391,608

## PROCESS FOR THE BENEFICIATION OF CARBONOUS MATERIALS WITH THE AID OF ULTRASOUND

Michael A. Dondelewski, 5354 Fortress Trail, Columbus, Ohio 43230

Continuation of Ser. No. 135,241, Mar. 31, 1980, abandoned. This application Aug. 3, 1981, Ser. No. 289,536

Int. Cl.³ C10L 1/00; C07G 13/00; C01B 31/02

U.S. Cl. 44—1 SR 7 Claims

1. A method of treating coal to reduce ash and sulfur content comprising the steps for:

(a) combining the coal with water and oil to form a slurry, said oil being a semi-reactive oil containing esters of fatty acids,

(b) applying ultrasound to said slurry to cause separation of ash from coal and sulfur including organic sulfur from coal,

(c) physically separating coal and adhered oil from the slurry and washing to separate ash and sulfur from the coal to recover coal with reduced sulfur and ash content.

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4,391,609

## HYDRODESULFURIZATION OF CHLORINIZED COAL

John J. Kalvinskas, South Pasadena, and Naresh K. Rohatgi, West Covina, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Oct. 30, 1981, Ser. No. 315,587

Int. Cl.³ C10L 9/10

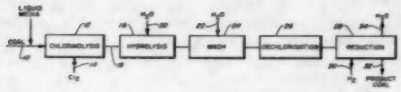
U.S. Cl. 44—1 SR 8 Claims

1. A method of desulfurizing coal containing at least 0.2% sulfur comprising the steps of:

(1) chlorinating the coal by forming a slurry of coal in liquid

media and bubbling chlorine gas into the slurry to convert sulfur in the coal into water soluble sulfates;

(2) subjecting the chlorinated coal to a gaseous reducing agent consisting essentially of hydrogen or a hydrogen




donor gas at a temperature from 500° C. to 700° C. until at least 70% of the sulfur is removed from the coal and the chlorine content is below 1%; and

(3) recovering a desulfurized and dechlorinated coal.

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**4,391,610**

## LIQUID HYDROCARBON FUEL CONTAINING A CORROSION INHIBITOR, DIALKOXYLATED ALKYL POLYOXYALKYL PRIMARY AMINE

**Rodney L. Sung, Fishkill; William M. Sweeney, Wappingers Falls, both of N.Y., and Wheeler C. Crawford, Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Jan. 8, 1982, Ser. No. 338,196**
**Int. Cl.³ C10L 1/22**
**U.S. Cl. 44—56** **20 Claims**

1. A fuel composition for use in internal combustion engines comprising

(a) a major portion of a fuel containing a hydrocarbon boiling in the gasoline boiling range; and

(b) a minor corrosion-inhibiting amount of, as a corrosion inhibiting agent, a dialkoxylated alkyl polyalkoxy primary amine.

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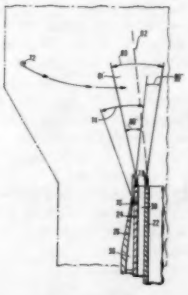
**4,391,611**

## GASIFICATION SYSTEM

**Gaurang B. Haldipur, Hempfield; Richard G. Anderson, Penn Hills, and Peter Cherish, Bethel Park, all of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Mar. 5, 1981, Ser. No. 240,654**
**Int. Cl.³ C10J 3/68**
**U.S. Cl. 48—197 R** **10 Claims**



1. A method of operating a gasification reactor of the type wherein solid particulate carbonaceous material, oxygen, steam and an oxygen lean medium are fed from an injection means having an upper tip into a vertically disposed vessel housing a combusting fluidized bed to produce a combustible product gas and ash, to prevent substantial sintering of said tip, comprising:

injecting a mixture of said particulate material and a transport gas vertically upward into said fluidized bed at a velocity of between 30 and 70 feet per second;

injecting a mixture of oxygen and steam upwardly into said bed and about the radial periphery of said particulate and gas mixture at a velocity of between 50 and 300 feet per second;

injecting an oxygen lean gaseous medium upwardly into said bed and about the radial periphery of said oxygen and steam mixture at a velocity equal to or less than said oxygen and steam mixture velocity.

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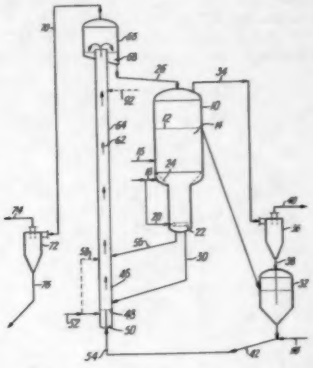
**4,391,612**

## GASIFICATION OF COAL

**Tsuan Y. Chang, Baldwin, N.Y., assignor to The Halcon SD Group, Inc., New York, N.Y.**

**Filed May 28, 1981, Ser. No. 267,959**
**Int. Cl.³ C10J 3/54**
**U.S. Cl. 48—202** **2 Claims**



1. A process for the production of a gaseous effluent rich in hydrogen and carbon monoxide from coal which comprises the steps of:

(a) feeding (1) clinker particles and char from the partial gasification with superheated steam of lime-treated coal in a gasification zone, and (2) air to a combustor zone operating at a temperature of 900° C. to 1300° C.;

(b) elevating said clinker particles and any "fines" present by the action of a gaseous stream comprising any excess air and the gases produced by the total combustion of the char with air to a clinker separation zone, said fines comprising ash resulting from the combustion of said char in said combustor zone and lime contained in said coal;

(c) separating the thus-elevated particles and fines in the separation zone into a stream of fines which are suspended in and carried away by the gaseous stream as solid product, and a body of clinker particles deposited from the gaseous stream;

(d) feeding the deposited clinker particles to the upper portion of said gasification zone while feeding lime-treated coal and superheated steam into the lower portion of said gasification zone, the unreacted steam and the gases resulting from the gasification of the lime-treated coal maintaining a fluidized bed comprising said lime-treated coal and the char produced by the partial gasification of the lime-treated coal, with said clinker particles raining down through said fluidized bed as a separate phase, the clinker particles and the steam supplying the heat for the gasification reaction to maintain the fluidized bed at a temperature of 700° C. to 1050° C.;

(e) removing the fuel gas generated in the gasification zone by the partial gasification of the lime-treated coal in the presence of steam, removing the char from the upper

portion of the fluidized bed in the gasification zone, removing the clinker particles from the lower portion of the gasification zone;

(f) passing the clinker and char removed from the gasification zone to the combustor zone to provide the feed of char and clinker particles for step (a);

(g) recovering the fines from the gaseous stream of step (c);

(h) preparing clinker particles from at least some of the fines recovered in step (g); and

(i) introducing the clinker particles produced in step (h) to make up for the loss of clinker particles resulting from attrition.

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**4,391,613**

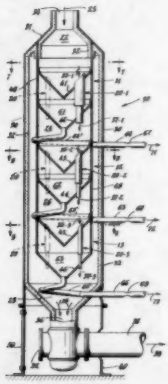
## MULTI-STATION DOWNFLOW CENTRIFUGAL SEPARATION METHOD AND APPARATUS FOR SEPARATING PARTICULATE MATTER FROM GASES

**Joseph G. Wilson, Riverside, Conn., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.**

**Continuation of Ser. No. 210,299, Nov. 25, 1980, abandoned, which is a continuation of Ser. No. 92,343, Nov. 8, 1979, Pat. No. 4,279,624, which is a continuation of Ser. No. 947,173, Sep. 28, 1978, abandoned. This application Nov. 18, 1981, Ser. No. 322,358**

**Int. Cl.³ B01D *45/12***

**U.S. Cl. 55—1** **22 Claims**



1. A method of separating particles from a particle-laden gas comprising the steps of:

providing a plurality of axially-extending, separating stations in generally axial alignment at spaced-apart, successively lower elevations;

in a first of said stations performing the steps of:

(a) swirling the gas with a given centrifugal action, and immediately thereafter, (b) directing the gas downwardly through a first plurality of annular channels,

then suddenly changing the direction of the gas and causing it to suddenly turn inwardly away from each of said channels, to cause particles of given sizes to be separated therefrom and left in said channels,

causing the inwardly-turned gas to flow again in the same said generally axial direction, and obstructing flow of said inwardly-turned gas in the opposite axial direction, and downwardly away from said first station into an intermediate region,

removing the separated particles together with a minor, bleed quantity of the gas from the bottom of the annular channels in said first station,

flowing the gas downwardly from the intermediate region to a second of said stations, and in said second station performing the steps of:

swirling the gas downwardly through a second plurality of annular channels under a more powerful centrifugal action than said given centrifugal action, and immediately thereafter directing the gas to, and conducting it in the same said generally axial direction through, a second plurality of annular channels,

then suddenly changing the direction of the gas and causing it to suddenly turn inwardly away from said second plurality of annular channels, to cause particles smaller in size than said given sizes to be separated therefrom and left in said second plurality of channels,

causing the gas which has been turned inwardly from said second plurality of channels to flow again in the same said generally axial direction, and obstructing flow thereof in the opposite axial direction, and downwardly away from said second station, and

removing the smaller size particles together with a minor, bleed quantity of the gas from the bottom of the plurality of annular channels in said second station.

9. An improved, downflow, centrifugal separator apparatus, for separating particulate matter from particle-laden gas having a given velocity and pressure, said apparatus having a plurality of elongate, vertically-disposed separator units, each of said units having a vertically-disposed tube which defines a channel within which to conduct particle-laden gas; first means within said tube for causing particle-laden gas admitted into said tube to be (a) centrifugally swirled, and (b) directed into said channel; an elongate, vertically-disposed vessel enclosing said separator units, said vessel having an inlet opening, substantially at an uppermost end thereof, and above said separator units, for admitting particle-laden gas into said separator units and into said tubes thereof, and said vessel having an outlet opening, substantially at a lowermost end thereof, and below said separator units, for discharging therethrough particle-removed gas from said units; said units further having means for removing separated particles, together with a minor percentage of gas, from said tubes; a first station, within said vessel, comprising a first plurality of said separator units mounted therewithin in parallel relationship; a second station, within said vessel, comprising a second plurality of separator units mounted therewithin in parallel relationship; said second station being spaced apart from said first station, axially of said vessel; and means intermediate said stations for conducting particle-separated gas from said first station to said second station; wherein the improvement is comprised by:

said separator units each having an additional tube positioned inside said vertically disposed tube so as to define an annular channel therebetween, and

said first means comprises means for swirling gas with a given centrifugal action, and directing gas immediately thereafter into said annular channel to cause flow thereof in a generally axial direction; wherein

said additional inner tube including slots therein for causing gas to turn inwardly, from said annular channel, into said tube;

said additional tube having a hosepiece positioned and arranged for causing gas turned into said tube from said channel to be redirected in said same generally axial direction, and (b) obstructing flow of such turned gas in the opposite axial direction; and

said first means of said first station comprises means for swirling gas with a centrifugal action which is less than the centrifugal action with which said first means of said second station can swirl gas.

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**4,391,614**

## METHOD AND APPARATUS FOR PREVENTING LUBRICANT FLOW FROM A VACUUM SOURCE TO A VACUUM CHAMBER

**Walter J. Rozmus, Traverse City, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.**

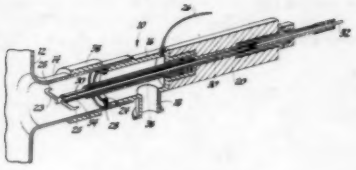
**Filed Nov. 16, 1981, Ser. No. 321,935**

**Int. Cl.³ B03C *9/00*; B65B *31/04***

**U.S. Cl. 55—2** **2 Claims**

1. An assembly comprising; a vacuum chamber (12) having

a vacuum outlet duct (14) for connection to a vacuum source to establish a stream of gas flow from said vacuum chamber (12) through said outlet duct (14) to a vacuum source, said assembly further comprising electric field-producing means (22, 23, 24) for producing an electric field to subject the lubricant entering the vacuum outlet duct (14) from a vacuum source to the electric field to electrically charge the lubricant and electrically attract the lubricant back toward a vacuum source, said electric field-producing means including a pair of first (22, 23) and second (24) electrodes spaced from one another between said vacuum chamber (12) and a vacuum source and power means (26, 32) for establishing an electrical potential between said electrodes, said first electrode (22, 23) being positioned closer to said vacuum chamber (12) than said second electrode (24), said power means establishing a potential so that the lubricant is charged by said first electrode (22, 23) and is thereby attracted back to said second electrode (24), and a magnet (38) positioned and arranged to establish a magnetic



field extending between said electrodes to urge the charged lubricant toward said second electrode.

2. A method for preventing lubricant from entering a vacuum chamber (12) through an outlet duct (14) connected to a vacuum source comprising the steps of; establishing an electric field and subjecting the lubricant entering the vacuum outlet duct (14) from the vacuum source to the electric field to electrically charge the lubricant and electrically attracting the lubricant back toward the vacuum source, establishing the electric field by positioning first (22, 23) and second (24) electrodes in spaced relationship to one another between the vacuum chamber (12) and the vacuum source, positioning the first electrode (22, 23) closer to the vacuum chamber (12) than the second electrode, establishing an electrical potential between the electrodes so that the lubricant is charged by the first electrode (22, 23) and is thereby attracted back to the second electrode (24), establishing a magnetic field between the electrodes (22, 23 and 24) to urge the charged lubricant toward the second electrode (24).

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**4,391,615**

## METHOD FOR FILTERING ATOMIC OR MOLECULAR CONTAMINANTS FROM A GAS

**Nicolaos Iniotakis, Jülich, Fed. Rep. of Germany, assignor to Kernforschungsanlage Jülich GmbH, Jülich, Fed. Rep. of Germany**

**Division of Ser. No. 56,784, Jul. 11, 1979, which is a continuation of Ser. No. 887,885, Dec. 6, 1977, abandoned. This application Nov. 3, 1981, Ser. No. 317,908**

**Int. Cl.³ B01D** *53/22*

**U.S. Cl. 55—16** **10 Claims**

1. A method of cleaning atomic or molecular contaminating particles out of a flowing gas by causing said particles to diffuse into a crystalline solid and become absorbed therein, comprising:

passing the contaminated particles through a cavity in which are disposed in a predetermined arrangement a plurality of rigid filter elements occupying a length l in the flow direction of the gas through said cavity,

said filter elements being made of a crystalline material selected from those having a known sticking probability for particles of a particular atomic or molecular contaminating material to be filtered, according to selection criteria having reference to a preselected filter escape coefficient $\delta(l, t)$ corresponding to a desired filter capability to be attained, the values of said length l and of the hydraulic free diameter $d_{eff}$ provided in said cavity with said arrangement of filter elements therein, said length l and diameter $d_{eff}$ dimensioned so that for a particular gas-flow velocity and a particular mass transfer coefficient, the product of their quotient $(l/d_{eff})$ nd the second Stanton number St' is large enough for attaining said desired filter capability and the filter coefficient corresponding thereto, said second Stanton number being the ratio (h/v) of said mass transfer coefficient to said gas flow velocity, said selection criteria being:

(a) said crystalline material has a high surface adsorptive sticking probability and for said contaminant particles on the surface of said filter elements;

(b) said crystalline material is one for which the desorption constant ($\theta$) regarding said contaminant is sufficiently small for attaining said described filter capacity;

(c) said crystalline material is one for which the penetration coefficient $(1-\beta)$, and hence also the probability that said contaminant particles enter into the material and become irreversibly bound therein rather than remain on the surface is sufficiently large for attaining said desired filter capability, and

(d) the saturation content ($\phi_\infty$) and the diffusion constant (D) are sufficiently large for the product

$$\frac{(1-\beta)\alpha^* N_G}{\sqrt{D}\cdot\phi_\infty}$$

to be smaller than unity, the quantities contributing to said product being defined as follows:

$$\alpha^* = \alpha \cdot 3.63 \times 10^3 \sqrt{\frac{T}{A}} \text{ in cm/sec}$$

A = mass number of the particles

T = temperature of the surface of the filter element in °K.

$N_G$ = concentration of the contaminant particles in the gas in atoms per $cm^2$.

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**4,391,616**

## METHOD OF DEHUMIDIFICATION

**Yoshio Imamura, Kyoto, Japan, assignor to Toyo Boseki Kabushiki Kaisha, Japan**

**Filed Jul. 21, 1981, Ser. No. 285,692**

**Claims priority, application Japan, Jul. 24, 1980, 55-102064**

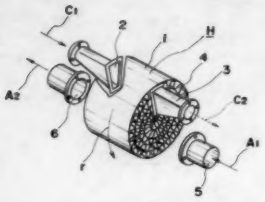
**Int. Cl.³ B01D** *53/04*

**U.S. Cl. 55—35** **21 Claims**

1. A method of dehumidification which comprises the steps of preparing a dehumidifying member composed of active carbon fiber material, in the form of sheets and bringing air to be dehumidified into contact with said dehumidifying member for the dehumidification of air.

20. An air dehumidifying arrangement which comprises a pair of dehumidifying members axially aligned and rotatably provided in a spaced relation from each other, each of said

dehumidifying members being formed by a moisture adsorbing element which is composed of a corrugated sheet of active carbon fibers and a flat separate sheet of active carbon fibers bonded to one surface of said corrugated sheet, and which is spirally wound to form said dehumidifying member, with air passage defined therebetween being arranged in substantially




the same direction, and a heat exchanging member fixedly disposed coaxially between said dehumidifying members and having one portion which allows air to be dehumidified to pass therethrough and through which cooling medium is passed for cooling the air to be dehumidified, and another portion for permitting hot air for dehumidification and regeneration of the active carbon fibers to pass therethrough.

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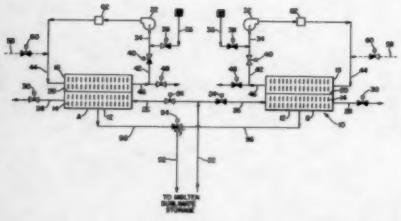
**4,391,617**

## PROCESS FOR THE RECOVERY OF VAPORIZED SUBLIMATES FROM GAS STREAMS

**Peter F. Way, P.O. Box 276, Boxford, Mass. 01921**

**Continuation-in-part of Ser. No. 942,616, Sep. 15, 1978, Pat. No. 4,252,772. This application Dec. 16, 1980, Ser. No. 216,934**
**The portion of the term of this patent subsequent to Feb. 24, 1998, has been disclaimed.**
**Int. Cl.³ B01D *7/00, 59/02;* C07D *307/89***
**U.S. Cl. 55—82** **10 Claims**



1. In a method for recovering sublimate vapors from hot gas streams as formed in chemical reactions, manufacturing processes, storage tank vents or the like, in a heat-pipe exchanger system operative in a condensing mode and in a melting mode, said exchanger system comprising a pair of adjacent housings in which heat-pipe exchanger tubes are mounted horizontally so that the opposite tube ends extend into each housing, said pair of housings include an air-side housing through which cooling or heating fluid such as air or gas may be passed and a condensing-side housing through which sublimate-laden gas may be passed, each of said housings including means for independent flow control of hot and cold exchanger fluid therethrough, the method comprising the steps of,

passing said hot gas stream through the condensing-side housing during the condensing mode to cool said gas stream and condense the contained sublimate vapors as a solid on the heat-pipe surfaces therein,

simultaneously passing ambient air through the opposite air-side housing at a rate to remove the heat of cooling and condensation of said gas stream, and

alternately switching to the melting mode by stopping the flow of gas through the condensing-side housing and passing heated air or hot gases through the air-side housing at a raised temperature sufficient to melt the condensed and deposited sublimate solids from the heat-pipe surfaces in said condenser-side housing and removing molten sublimate therefrom.

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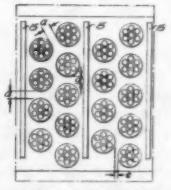
**4,391,618**

## PROCESS AND APPARATUS FOR THE MANUFACTURE OF FIBERS

**Jacques Lecron, Chambery; Maxime Manera, Jacob Bellecombette; Jean-Paul Faure, Chignin-Challes les Eaux, and Jean-Pierre Renaudin, Cognin, all of France, assignors to Societe Vetrotex Saint-Gobain, Chambery, France**

**Continuation of Ser. No. 207,712, Nov. 17, 1980, abandoned. This application May 13, 1982, Ser. No. 377,903**
**Claims priority, application France, Nov. 20, 1979, 79 28538**
**Int. Cl.³ C03B *37/025***
**U.S. Cl. 65—1** **36 Claims**



27. A method for drawing attenuable material in attenuable condition, such as molten glass, into filaments, characterized by delivering the attenuable material in attenuable condition downwardly through a bushing the bottom of which has a plurality of series of bosses defining alveoles, each series comprising a multiplicity of bosses, each with a bottom wall having a plurality of orifices therethrough in communication with an alveole, and concurrently drawing at least one filament from each alveole, independently of each other alveole, regardless of whether or not said material has flooded the bottom surface of any individual alveole.

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**4,391,619**

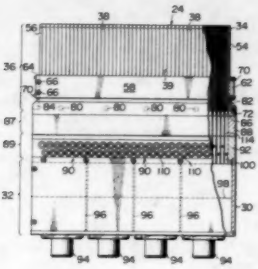
## AIR NOZZLE APPARATUS FOR USE IN DRAWING GLASS FIBERS

**Hiroaki Shono, and Toshiaki Kikuchi, both of Fukushima, Japan, assignors to Nitto Boseki Co., Ltd., Fukushima, Japan**

**Filed Sep. 23, 1982, Ser. No. 421,908**
**Claims priority, application Japan, Oct. 14, 1981, 56-163647; Oct. 14, 1981, 56-163648; Oct. 15, 1981, 56-164474; Oct. 15, 1981, 56-164475; Oct. 15, 1981, 56-164476**
**Int. Cl.³ C03B *37/025***
**U.S. Cl. 65—12** **18 Claims**

1. An air nozzle apparatus for directing air flow against the undersurface of an orifice plate of a glass fiber drawing forehearth, comprising: an air introducing section including a manifold formed with at least one air supply port; and an air nozzle section formed with a plurality of nozzle channels communicating with the manifold, said air nozzle section including a plurality of nozzle ribs of substantially the same shape each having opposed side surfaces and opposed end edge portions, said plurality of nozzle ribs being arranged to have their side surfaces located in adjacent relationship to provide a

nozzle block, said nozzle ribs each being formed on at least one of the opposed side surfaces with a longitudinally extending



recess which defines one of said plurality of nozzle channels between the adjacent nozzle ribs.

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**4,391,620**

## METHOD AND DEVICE FOR APPLYING LUBRICATION OR SEPARATION LIQUID TO GLASS-FORMING MACHINE

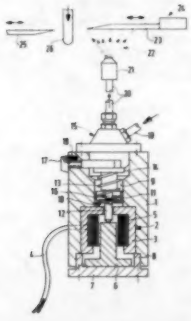
**Gerhard Geisel, Bückeburg, Fed. Rep. of Germany, assignor to Hermann Heye, Obernkirchen, Fed. Rep. of Germany**

**Filed Feb. 17, 1981, Ser. No. 235,137**

**Claims priority, application Fed. Rep. of Germany, Feb. 28, 1980, 3007512**

**Int. Cl.³ C03B *40/02***

**U.S. Cl. 65—26** **16 Claims**



1. A method of an intermittent application of a lubrication or separation liquid without admixture of a carrier gas on at least one part of a glass-forming machine prior to its contact with the processed molten glass, such as shearing blades for shearing gobs off a glass strand, a gravity tube or a chute for guiding glass gobs, a mold, a mold part or a press plunger, comprising the steps of momentarily compressing the lubrication or separation liquid to a pressure exceeding 100 bar; then atomizing the compressed liquid; and applying a cone of the atomized liquid onto said machine part.

**4,391,621**

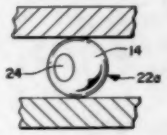
## METHOD OF MAKING LENSES HAVING A SPHERICAL FACE

**Walter P. Siegmund, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.**

**Filed Mar. 23, 1981, Ser. No. 246,551**

**Int. Cl.³ C03C *15/02, 19/00***

**U.S. Cl. 65—31** **7 Claims**



1. A method of making lenses comprising the steps of:

assembling a preform of glasses including a rod of lens glass and a surrounding cladding of leachable glass, said rod being of greater diametral size than desired of said lenses;

heating and drawing the preform to such a reduced cross-sectional size as to bring said rod to the diameter desired of said lenses;

cutting said drawn preform transaxially into a number of sections of lengths approximately equally the drawn preform diameter;

grinding said sections into spherical configurations of radii of curvature equalling that desired of at least one face of each of said lenses;

removing remaining leachable glasses from said sections whereby rod glasses each having at least one spherical face comprise said lenses; and

polishing said spherical faces of said lenses at a stage of said method following said grinding step.

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**4,391,622**

## METHOD FOR THE PRECISION/MANUFACTURE OF GLASS ARTICLES

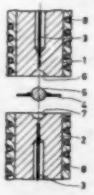
**Cornelis L. Alting; Rudolf Brehm, and Jan Haisma, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed May 18, 1981, Ser. No. 264,738**

**Claims priority, application Netherlands, May 28, 1980, 8003050**

**Int. Cl.³ C03B *11/08, 40/00***

**U.S. Cl. 65—66** **3 Claims**



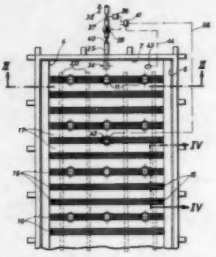
1. In a method for precision manufacture of glass articles molded in a mold or hot-pressed in a die, the improvement comprises the step of using a mold or die having at least contact surfaces made from quartz glass or an amorphous $SiO_2$ with upto 7.5% by weight of $TiO_2$ with a coefficient of linear expansion of at most $60\times10^{-8}$ per °C., wherein said glass articles have a substantially higher coefficient of linear expansion.

## 4,391,623

## METHOD FOR MAKING OF SOLID FERTILIZER BY SEPARATION OF LIQUID MANURE AND DEVICE FOR CARRYING OUT THIS METHOD

Hermann Knepper, Olfen, Fed. Rep. of Germany, assignor to Heinrich Bernhard Brinkmann, Bergkamen-Overberge, Fed. Rep. of Germany

Filed Apr. 24, 1981, Ser. No. 257,403
Claims priority, application Fed. Rep. of Germany, Nov. 22, 1980, 3044022
Int. Cl.³ C05F 3/00, 3/06
U.S. Cl. 71—21 5 Claims



1. In a method of making a solid fertilizer by separation of liquid manure into a solid phase and a liquid phase by means of a filter vessel into which the liquid manure is charged, said filter vessel having a bottom and a top and at least one closeable discharge opening, the improvement comprising the steps of immersing the bottom of the filter vessel into a liquid; then introducing the liquid manure into the filter vessel and leaving the liquid manure in said vessel in a resting stage until a solid phase of the manure is collected on the top of the filter vessel and the liquid phase is collected therebelow; discharging the liquid phase from the vessel to such an extent that the solid phase almost reaches the bottom of the filter vessel; interrupting said discharging step and waiting for a renewed separation of the solid phase from the liquid phase and for collecting the solid phase on the top of the vessel and the liquid phase therebelow; and discharging a liquid phase of the manure newly collected in the filter vessel.

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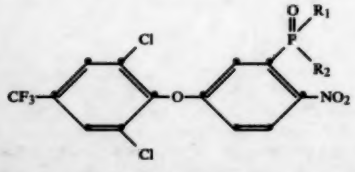
## 4,391,624

## HERBICIDALLY ACTIVE 2-SUBSTITUTED 5-PHENOXYPHENYLPHOSPHONIC ACID ESTERS

Ludwig Maier, Arlesheim, and Dieter Dürr, Bottmingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 117,167, Jan. 31, 1980, Pat. No. 4,322,375. This application Jun. 1, 1981, Ser. No. 269,228
Claims priority, application Switzerland, Feb. 6, 1979, 1147/79
Int. Cl.³ A01N 57/18; C07F 9/40
U.S. Cl. 71—86 5 Claims

1. A 2-nitro-5-(2',6'-dichloro-4'-trifluoromethylphenoxy)-phenylphosphonic acid derivative of the formula



wherein $R_1$ and $R_2$ are $C_1$–$C_3$-alkoxy.

2. A method for selectively controlling weeds in crop cultures which comprises applying to the locus of said weeds and crops a herbicidally effective amount of a compound according to claim 1.

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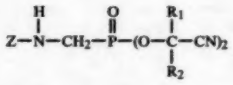
## 4,391,625

## DIESTERS OF N-ALKYL SUBSTITUTED AMINO METHYL PHOSPHONIC ACID USEFUL AS HERBICIDES

William R. Purdum, Maryland Heights, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Jun. 19, 1981, Ser. No. 275,463
Int. Cl.³ A01N 57/18; C07F 9/40
U.S. Cl. 71—86 35 Claims

1. Diesters of N-alkyl substituted amino methyl phosphonic acid of the formula



wherein Z is

wherein R is lower alkyl; or Z is lower alkynyl or lower alkyl; $R_1$ is selected from the group consisting of lower alkyl, lower alkoxy lower alkyl, halo lower alkyl, and phenyl lower alkyl, and $R_2$ is hydrogen or lower alkyl.

24. A herbicidal method which comprises contacting a plant with a herbicidally effective amount of a compound of claim 1.

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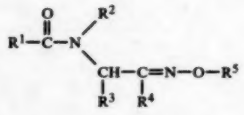
## 4,391,626

## HALOALKYLAMIDE COMPOUNDS AND HERBICIDAL ANTIDOTE COMPOSITIONS

Jörg Stetter; Wolf Reiser, both of Wuppertal, and Wilfried Faust, Odenthal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 19, 1981, Ser. No. 226,287
Claims priority, application Fed. Rep. of Germany, Feb. 9, 1980, 3004871
Int. Cl.³ A01N 37/00, 37/18; C07C 103/44
U.S. Cl. 71—88 42 Claims

1. Haloalkylamide compound of the formula



(I)

wherein

$R^1$ is haloalkyl;

$R^2$ is alkyl, alkenyl, alkynyl, alkoxyalkyl, alkylthioalkyl, haloalkyl or alkoximinoalkyl;

$R^3$ is hydrogen or alkyl with 1 to 4 carbon atoms;

$R^4$ is hydrogen or alkyl with 1 to 4 carbon atoms; and

$R^5$ is hydrogen, alkyl, alkenyl, alkynyl or aralkyl.

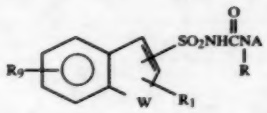
32. Herbicidal composition comprising a herbicidally active compound selected from thiolcarbamates and acetanilide herbicides and, as an antidote, an effective amount of a haloalkylamide compound as claimed in claim 1.

## 4,391,627
## HERBICIDAL BENZOTHIOPHENE AND BENZOFURAN SULFONAMIDES

George Levitt, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 172,997, Jul. 25, 1980, abandoned. This application Jun. 22, 1981, Ser. No. 274,233
Int. Cl.³ A01N *43/54*; C07D *239/26*
U.S. Cl. 71—90 35 Claims

1. A compound of the formula:



I

wherein

R is H or $CH_3$;

$R^1$ is H, Cl, Br, $NO_2$, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ alkoxy, $CO_2R^2$, $C(O)NR^3R^4$, $SO_2R^5$ or $SO_2NR^6R^7$;

$R^2$ is $C_1$–$C_4$ alkyl, $C_3$–$C_4$ alkenyl, $CH_2CH_2OCH_3$, $CH_2CH_2OC_2H_5$, $CH_2CH_2CH_2OCH_3$ or $CH_2R^8$;

$R^3$ is $C_1$–$C_4$ alkyl;

$R^4$ is H, $C_1$–$C_4$ alkyl or $OCH_3$; or

$R^3$ and $R^4$ can be taken together to form $—(CH_2)_4—$;

$R^5$ is $C_1$–$C_4$ alkyl;

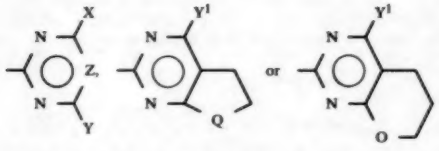
$R^6$ is $C_1$–$C_3$ alkyl or $OCH_3$;

$R^7$ is $C_1$–$C_3$ alkyl;

$R^8$ is $C_1$–$C_3$ alkyl substituted with 1–3 atoms of F, Cl, or Br;

$R^9$ is H, $CH_3$, $OCH_3$, Cl, Br or $NO_2$; W is O or S;

A is



X is H, $CH_3$, $OCH_3$, $OC_2H_5$, $OCH_2CF_3$, $CH_2OCH_3$ or Cl;

Y is $CH_3$, $OCH_3$, $OC_2H_5$, $NH_2$, $NHCH_3$, $N(CH_3)_2$ or $SCH_3$;

Z is N, CH, C—Cl, C—Br, C—CN, C—$CH_3$, C—$C_2H_5$, C—$CH_2CH_2Cl$ or C—$CH_2CH{=}CH_2$;

$Y^1$ is H, $CH_3$, $OCH_3$ or Cl; and

Q is O or $CH_2$;

provided that

(1) when $R^4$ or $R^6$ is $OCH_3$, then $R^3$ or $R^7$ is $CH_3$;

(2) the total number of carbon atoms of either $R^3$ and $R^4$, or $R^6$ and $R^7$, is less than or equal to 4; and

(3) when X is Cl, then Z is CH.

19. A composition for controlling the growth of undesired vegetation which comprises an effective amount of a compound of claim 1 and at least one of the following: surfactant, solid or liquid diluent.

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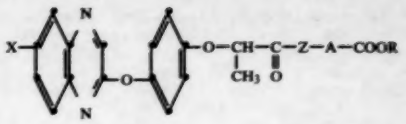
## 4,391,628
## 2-[4-(6-HALOQUINOXALINYL-2-OXY)PHENOXY]PROPIONIC ACID ESTERS

Hermann Rempfler, Ettingen, and Beat Böhner, Binningen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 5, 1982, Ser. No. 346,359
Claims priority, application Switzerland, Feb. 16, 1981, 1009/81
Int. Cl.³ C07D *241/44*, *241/52*; A01N *43/60*
U.S. Cl. 71—92 19 Claims

1. A 2-[4-(6-Haloquinoxalinyl-2-oxy)phenoxy]propionic acid ester of the general formula I



(I)

wherein X is fluorine, chlorine or bromine, Z is oxygen or sulfur, A is a $C_1$–$C_4$alkylene bridge which is unsubstituted or substituted by methyl or ethyl, and R is $C_1$–$C_4$alkyl.

13. A method of controlling unwanted plant growth which comprises treating the unwanted plants or the locus thereof with a herbicidally effective amount of a compound of the formula I according to claim 1.

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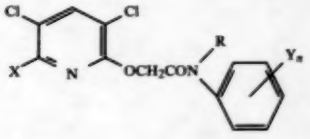
## 4,391,629
## 2-PYRIDYLOXYACETANILIDES AND THEIR USE AS HERBICIDES

Masahiro Aya; Junichi Saito; Kazuomi Yasui; Shinzo Kakabu; Atsumi Kamochi, and Naoko Yamaguchi, all of Tokyo, Japan, assignors to Nihon Tokushu Noyaku Seizo K.K., Tokyo, Japan

Filed Jan. 21, 1982, Ser. No. 341,379
Claims priority, application Japan, Jan. 28, 1981, 56-10110
Int. Cl.³ C07D *213/64*; A01N *43/40*
U.S. Cl. 71—94 11 Claims

1. A 2-pyridyloxyacetanilide of the formula



in which

X is hydrogen, halogen, $C_1$–$C_4$ alkyl or $C_1$–$C_4$ halogenoalkyl,

R is $C_1$–$C_4$ alkyl,

Y each independently is halogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy or $C_1$–$C_4$ halogenoalkyl, and

n is 0, 1, 2 or 3.

7. A method of combating weeds, comprising applying to said weeds, or to a habitat thereof, a herbicidally effective amount of a compound according to claim 1.

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## 4,391,630
## CYANO-(4-CYANOPHENYL)METHYL ETHYL ESTER OF CARBONIC ACID USEFUL AS AN AGENT FOR SELECTIVE CONTROL OF BARNYARD GRASS

Andrew T. Au, Needham, Mass., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 3, 1982, Ser. No. 354,480
Int. Cl.³ A01N *47/06*; C07C *121/75*
U.S. Cl. 71—105 3 Claims

1. Cyano-(4-cyanophenyl)methyl ethyl ester of carbonic acid.

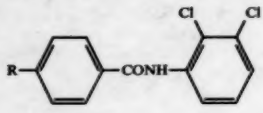
3. A herbicidal composition comprising an inert horticultural carrier and as a herbicide, the compound of claim 1, the concentration of said herbicide being from 0.0001 to about 50 percent by weight.

## 4,391,631
## HERBICIDAL COMPOSITION

Tetsuo Takematsu, Utsunomiya; Takayuki Isogawa, and Yasuya Sakuraba, both of Tokyo, all of Japan, assignors to Hodogaya Chemical Co., Ltd., Tokyo, Japan

Filed Sep. 29, 1981, Ser. No. 306,871
Claims priority, application Japan, Nov. 6, 1980, 55-155160
Int. Cl.³ A01N *37/18*
U.S. Cl. 71—118 3 Claims

1. A herbicidal composition which consists essentially of a benzamide having the formula:




wherein R represents n—$C_4H_9O$—, $C_2H_5OCH_2O$— or n—$C_4H_9OCH_2O$— and 3,4-dichloropropionanilide as active ingredients in an effective amount for controlling weeds and an adjuvant.

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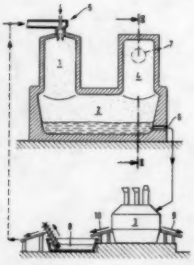
## 4,391,632
## PROCESS FOR THE SEPARATION OF LEAD FROM A SULFIDIC CONCENTRATE

Olavi A. Aaltonen, Pori; Rolf E. Malmström, Helsinki; Esko O. Nermes, Turku, and Tapio K. Tuominen, Espoo, all of Finland, assignors to Outokumpu Oy, Helsinki, Finland

Filed Apr. 15, 1981, Ser. No. 254,211
Claims priority, application Finland, Apr. 16, 1980, 801214
Int. Cl.³ C22B *13/02*
U.S. Cl. 75—26 7 Claims



1. A process for the separation of lead from a sulfidic concentrate using a flash-smelting furnace which has a lower furnace, a riser pipe connected to the lower furnace for removing gas from the lower furnace, and a reaction shaft connected to the lower furnace, said reaction shaft having an upper section with means for feeding said concentrate into said upper section, comprising the steps of feeding a finely-divided concentrate, a silicate-high slagging agent, and air or oxygen-enriched air into said upper section of said reaction shaft in order to form a suspension and to oxidize the lead to lead oxide, removing gases via said riser pipe, and withdrawing melt from said lower furnace for further treatment which process further comprises feeding the slagging agent at such a rate that substantially all of the lead oxide reacts with the slagging agent to produce lead silicate, resulting in a melt in the form of a slag containing substantially all of the lead silicate in said lower furnace, withdrawing melt from the lower furnace; and directing all of the melt withdrawn from the lower furnace to a reduction furnace in order to reduce the lead silicate to produce raw lead and a slag low in lead and high in silicate and separating raw lead from the slag.

## 4,391,633
## PROCESS FOR DEPHOSPHORIZATION, DESULFURIZATION AND DENITRIFICATION OF CHROMIUM-CONTAINING PIG IRON

Takashi Yamauchi; Shigeaki Maruhashi, and Morihiro Hasegawa, all of Yamaguchi, Japan, assignors to Nisshin Steel Company, Ltd., Tokyo, Japan

Filed Oct. 16, 1981, Ser. No. 312,065
Claims priority, application Japan, Oct. 21, 1980, 55-146351
Int. Cl.³ C21C *7/02*
U.S. Cl. 75—53 11 Claims

1. A process for dephosphorization, desulfurization and denitrification of chromium-containing pig iron comprising contacting the melt of said iron with a slag comprising not less than 10% and less than 40% of CaO, not less than 5% and not more than 40% of iron oxides and more than 40% and not more than 80% of $CaF_2$ in which the contact of $SiO_2$ as an impurity is not more than 10% and the ratio $\%CaO/\%SiO_2$ is not less than 3.

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## 4,391,634
## WELDABLE OXIDE DISPERSION STRENGTHENED ALLOYS

Thomas J. Kelly, Suffern, and Mark L. Robinson, Warwick, both of N.Y., assignors to Huntington Alloys, Inc., Huntington, W. Va.

Filed Mar. 1, 1982, Ser. No. 353,036
Int. Cl.³ C22C *38/06, 38/18, 38/24, 38/26*
U.S. Cl. 75—124 25 Claims

1. A weldable refractory-oxide dispersion strengthened alloy affording oxidation resistance and strength at elevated temperatures, said alloy being ferritic and substantially titanium-free and consisting essentially, by weight, of about 10 to about 40% chromium, about 1 to about 10% aluminum, a minor amount of at least one of the additives tantalum, niobium and hafnium and the balance essentially iron, and said alloy being characterized on fusion welding by good oxide dispersoid distribution in the weld zone.

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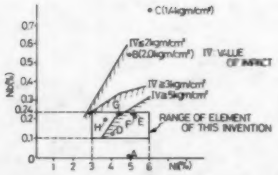
## 4,391,635
## HIGH CR LOW NI TWO-PHASED CAST STAINLESS STEEL

Shinichi Murakami, Osaka; Toshiaki Morichika, Hirakata; Hisashi Hiraishi, Yawata, and Hiroyuki Shiokawa, Osaka, all of Japan, assignors to Kubota, Ltd., Osaka, Japan

Continuation of Ser. No. 189,335, Sep. 22, 1980, abandoned. This application Jul. 6, 1981, Ser. No. 280,237
Int. Cl.³ C22C *38/42, 38/48*
U.S. Cl. 75—125 7 Claims




1. A ferrite-austenitic two-phased cast stainless steel having an impact strength of at least 3 kg-m/cm² and containing the following (weight %):

| | |
|---|---|
| C | less than 0.10% |
| Si | less than 1.5% |
| Mn | less than 1.5% |
| P and S | less than 0.4% each |
| Cr | 22–30% |
| Ni | 3–6% |
| Mo | 0.5–0.9% |

-continued

| | |
|---|---|
| Cu | 0.4–1.0% |
| N | less than 0.1% |
| Nb | 0.1–0.24% |
| Fe | balance |

wherein values of Ni equivalent and Cr equivalent are calculated by the following equations:

Cr eq=Cr%+Mo%+1.5 Si%+0.5 Nb%

Ni eq=Ni%+0.5 Mn%+30 C%

Cr eq/Ni eq being 3 to 4.5 and ferrite content being 50 to 80%.

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**4,391,636**

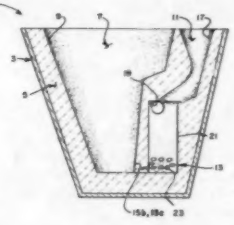
**METHOD OF AND APPARATUS FOR THE PRODUCTION OF NODULAR (DUCTILE) CAST IRON**

**Michael W. Windish, Bridgeton, Mo., assignor to Wintec Company, St. Louis, Mo.**

**Filed Dec. 16, 1981, Ser. No. 331,163**

**Int. Cl.³ C22C 37/00; C21C 7/00**

**U.S. Cl. 75—130 R** **10 Claims**



1. A process for the production of ductile cast iron from a molten base iron which, but for the treatment of said process, would be a grey cast iron upon solidification, said process being carried out in a treatment ladle lined with a suitable refractory material, said ladle having a main chamber therein, a reaction chamber, and a charging and filling passage leading from the top of said ladle to said reaction chamber, the latter being in communication with the lower portion of the main chamber, said process comprising of the steps of:

charging said reaction chamber with a quantity of a nodularizing agent;

pouring said molten base metal into said reaction chamber via said charging and filling passage thereby to effect a reaction between said nodularizing agent and said base metals;

rapidly establishing a hydrostatic pressure head over said reaction chamber of sufficient depth thereby to maximize the recovery of said nodularizing agent in said base metal; and

permitting said base metal with the dissolved nodularizing agent therein to flow into said main chamber.

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**4,391,637**

**RHEOLOGICAL ADDITIVE FOR NON-AQUEOUS FLUID SYSTEMS**

**Wilbur S. Mardis, Trenton, N.J., and Claude M. Finlayson, Houston, Tex., assignors to NL Industries, Inc., New York, N.Y.**

**Filed Oct. 19, 1981, Ser. No. 313,031**

**Int. Cl.³ C09D 11/00; C08L 91/06; C07F 5/06**

**U.S. Cl. 106—20** **13 Claims**

1. A non-aqueous fluid system which comprises: a non-aqueous fluid composition and an organophilic clay rheological composition which is the reaction product of an organic cationic quaternary ammonium compound and a smectite-type clay having a cation exchange capacity of at least 75 milliequivalents per 100 grams of said clay, wherein said organic cationic quaternary ammonium compound has the positive charge on a single atom and contains

(a) a first member selected from the group consisting of a $\beta,\gamma$-unsaturated alkyl group, a hydroxyalkyl group having 2 to 6 carbon atoms and mixtures thereof,

(b) a second member comprising a long chain alkyl group having 12 to 60 carbon atoms and

(c) a third and fourth member selected from a member of group (a), an aralkyl group, an alkyl group having 1 to 22 carbon atoms and a mixture thereof; and wherein the amount of said organic cationic quaternary ammonium compound is from 90 to 140 milliequivalents per 100 grams of said clay, 100% active clay basis.

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**4,391,638**

**METHOD FOR RECLAIMING INK WASTE**

**Gerard A. Fusco, North Brunswick, and Glenn van Lier, Hillsborough, both of N.J., assignors to J. M. Huber Corporation, Locust, N.J.**

**Filed Apr. 22, 1982, Ser. No. 370,884**

**Int. Cl.³ C09D 11/02**

**U.S. Cl. 106—20** **14 Claims**

1. A method for reclaiming waste ink contaminated with solid, fibrous impurities comprising,

diluting said waste ink with ink oil to form an ink mixture;

heating said mixture until the viscosity of said mixture is less than substantially 60 poise;

thereafter, subjecting said mixture to an angular acceleration sufficient to separate said solid, fibrous impurities from said ink mixture to produce a clarified ink; and

blending with said clarified ink sufficient virgin ink to produce a printing ink having a predetermined rheological property.

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**4,391,639**

**RECORDING LIQUID**

**Masatsune Kobayashi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

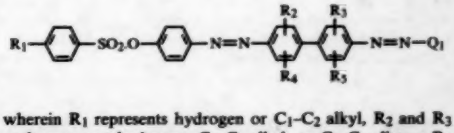
**Filed Sep. 2, 1982, Ser. No. 413,989**

**Claims priority, application Japan, Sep. 10, 1981, 56-142644**

**Int. Cl.³ C09D 11/02**

**U.S. Cl. 106—22** **3 Claims**

1. A recording liquid characterized by containing as a dye a compound represented by the formula



wherein $R_1$ represents hydrogen or $C_1$–$C_2$ alkyl, $R_2$ and $R_3$ each represent hydrogen, $C_1$–$C_2$ alkyl, or $C_1$–$C_2$ alkoxy, $R_4$ and $R_5$ represent hydrogen or sulfo in salt form with base, and $Q_1$ represents naphthyl substituted by hydroxyl and by sulfo in salt form with base in water or a mixture of water and a water-soluble organic solvent.

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**4,391,640**

**PROCESS FOR PRODUCING OIL-MODIFIED AND ROSIN-MODIFIED PHENOLIC RESIN FOR PRINTING INKS**

**Noboru Okoshi; Kin-ichi Kudo, and Shoichi Shimoyama, all of Chiba, Japan, assignors to Dainippon Ink & Chemicals, Inc., Tokyo, Japan**

**Filed Jun. 3, 1981, Ser. No. 270,021**

**Claims priority, application Japan, Jun. 5, 1980, 55-74920**

**Int. Cl.³ C09D 11/06, 11/08**

**U.S. Cl. 106—29** **18 Claims**

1. A process for producing an animal or vegetable oil-modi-

fied and rosin-modified phenolic resin for printing inks, which comprises:

(I) reacting (a) a resol phenol/formaldehyde initial condensation product, (b) an animal or vegetable oil having an iodine value of 100 to 210 or containing a hydroxyl group, (c) a rosin and (d) an alcohol; or

(II) reacting the condensation product (a) and the animal or vegetable oil (b) with a rosin ester obtained by the reaction of the rosin (c) and the alcohol (d).

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**4,391,641**

**SINTERED POWDER METAL FRICTION MATERIAL**

**Herbert W. Lloyd, Monsey, N.Y., assignor to Abex Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 218,316, Dec. 19, 1980, abandoned. This application Nov. 6, 1981, Ser. No. 318,719**

**Int. Cl.³ C08K *3/08, 3/06, 3/04***

**U.S. Cl. 106—36** **10 Claims**

1. An iron-base, sintered powder metal friction material for railroad braking use formed by solid phase sintering and consisting essentially of, by volume, 10–70% carbon in the form of coke or graphite; 0–2.5% sulfur; 0–10% alumina; 9–40% of a metal powder additive selected from the group consisting of copper, manganese, ferrochrome, and chrome carbide compounds; and the balance iron.

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**4,391,642**

**ALKALI METAL SILICATE BINDER COMPOSITIONS**

**John Stevenson, Sutton Coldfield; Alan Cross, Rubery, and John G. Anderson, Birmingham, all of England, assignors to Foseco International Limited, Birmingham, England**

**PCT No. PCT/GB80/00019, § 371 Date Oct. 27, 1980, § 102(e) Date Aug. 13, 1980, PCT Pub. No. WO80/01768, PCT Pub. Date Sep. 4, 1980**

**PCT Filed Feb. 4, 1980, Ser. No. 199,927**

**Claims priority, application United Kingdom, Feb. 27, 1979, 7906875**

**Int. Cl.³ B28B *7/36*; C08L *1/00***

**U.S. Cl. 106—38.23** **15 Claims**

1. A binder composition in aqueous solution obtained by mixing 15–47% by weight of an alkali metal silicate and 2–45% by weight of a substantially water soluble carbohydrate selected from nonosaccharides, disaccharides, polysaccharides and derivatives thereof and characterised in that it also contains 0.1–10% by weight of a phenolic compound selected from the group consisting of catechol, resorcinol, quinol, pyrogallol, an alkyl derivative of a di- or trihydric phenol, a hydroxy benzene dimer or oligomer containing two or more benzene rings and one or more hydroxyl groups, salicylic acid, gallic acid and mixtures thereof.

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**4,391,643**

**RAPIDLY DISSOLVABLE SILICATES AND METHODS OF USING THE SAME**

**Joseph R. Murphey, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.**

**Filed May 21, 1981, Ser. No. 265,821**

**Int. Cl.³ C04B *19/04***

**U.S. Cl. 106—74** **5 Claims**

4. An improved method of sealing or cementing an earth formation of the type utilizing a silicate solution prepared at the site of such sealing or cementing operations from a rapidly dissolvable partially hydrated powder silicate, the improvement comprising the steps of:

preparing said silicate solution at the earth formation location by dissolving a rapidly dissolvable partially hydrated, powdered silicate having a molar ratio of silicon dioxide to alkali metal oxide in the range of from about 1.5:1 to about 3.3:1 and wherein said alkali metal is selected from the group consisting of sodium, potassium and mixtures thereof; and

utilizing the resulting solution in said sealing or cementing method.

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**4,391,644**

**SHAPED ARTICLES MADE FROM EXPANDED MINERALS**

**Peter Eckardt, Hofheim am Taunus, and Franz J. Voetz, Camberg, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jan. 21, 1982, Ser. No. 341,233**

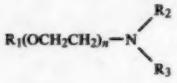
**Claims priority, application Fed. Rep. of Germany, Jan. 27, 1981, 3102542**

**Int. Cl.³ C04B *31/44***

**U.S. Cl. 106—85** **5 Claims**

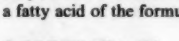
1. Shaped articles made from expanded minerals obtained by treating a mixture of a hydrophobized expanded mineral and a calcium aluminate with an aqueous solution of aluminum phosphate, and subsequently consolidating it under the action of pressure and heat; the expanded mineral having been hydrophobized with a hydrophobizing agent consisting substantially of

(a) a fatty amine of the formula

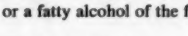


in which $R_1$ is $C_8$–$C_{22}$-alkyl, preferably $C_{14}$–$C_{22}$-alkyl, $C_{14}$–$C_{22}$-alkenyl or $C_8$–$C_{22}$-alkylphenyl, $R_2$ and $R_3$ each are hydrogen, $C_1$–$C_4$-alkyl or $C_2$–$C_4$-alkenyl, phenyl or benzyl, and n is a number of from 0 to 4;

(b) a fatty acid of the formula



or a fatty alcohol of the formula



in which $R_5$ is $C_8$–$C_{22}$-alkyl, preferably $C_{14}$–$C_{22}$-alkyl or -alkenyl, $R_6$ is $C_9$–$C_{22}$-alkyl, preferably $C_{15}$–$C_{23}$-alkyl or -alkenyl, and m is a number of from 0 to 2; and

(c) a low molecular weight acid.

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**4,391,645**

**ADDITIVES FOR CEMENTITIOUS MATERIALS**

**Alphonso W. Marcellis, Boonton, and Grannis S. Johnson, Plainfield, both of N.J., assignors to Diamond Shamrock Corporation, Dallas, Tex.**

**Filed Apr. 12, 1982, Ser. No. 367,263**

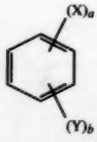
**Int. Cl.³ C04B *7/35***

**U.S. Cl. 106—90** **17 Claims**

1. An additive for cementitious materials comprising:

(a) at least one salt of aromatic sulfonic acid formaldehyde condensate, and

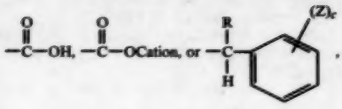
(b) at least one hydroxy aromatic compound selected from:



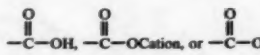

where

X is —OH or —O Cation, a is 1,2 or 3,

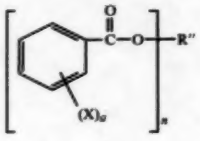
Y is



b is 0, 1, 2 or 3 with the proviso that where a is 1, b is 1,
R is —H or lower alkyl,
Z is —OH, —O Cation,

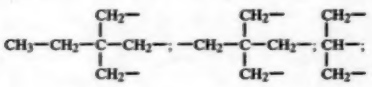


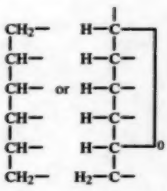
R′ is —H or lower alkyl and c is 0, 1, 2 or 3 and



where
X is —OH or —O Cation, a is 1, 2 or 3, n is a whole number of 1 to 6 and

R″ is —$CH_3$; —$CH_2CH_3$; —$CH_2CH_2CH_3$; —$CH_2CH_2$—;





with the proviso that when n does not completely satisfy all of the bonds of R″, the remaining bonds are satisfied with —OH.

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**4,391,646**

## GLASS BUBBLES OF INCREASED COLLAPSE STRENGTH

**Peter A. Howell, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Feb. 25, 1982, Ser. No. 352,164**
**Int. Cl.³ C04B** *31/02;* **C03C** *13/00*
**U.S. Cl. 106—97** **34 Claims**

1. Glass bubbles of average diameter between about 5 and 200 micrometers and average particle density of at least 0.4 gram/cubic centimeter consisting essentially of the following ingredients in the stated weight-percents:

| | |
|---|---|
| $SiO_2$ | 60-90 |
| Alkali metal oxide | 2-20 |
| $B_2O_3$ | 1-30 |
| S | 0.005-0.5 |
| RO | 0-25 |
| $RO_2$ (other than $SiO_2$) | 0-10 |
| $R_2O_3$ (other than $B_2O_3$) | 0-20 |
| $R_2O_5$ | 0-10 |
| F | 0-5 |
| Other ingredients | 0-2 |

13. Cement product comprising a cementitious matrix and glass bubbles of claim 1 dispersed in the matrix.

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**4,391,647**

## SPACKELING COMPOSITION

**Carmine A. Deer, Westfield, and Frank G. Cacossa, Livingston, both of N.J., assignors to Sand and Sea Corporation, Sarasota, Fla.**

**Filed Jul. 6, 1981, Ser. No. 280,308**
**Int. Cl.³ C04B** *11/10, 11/14, 11/24*
**U.S. Cl. 106—115** **9 Claims**

1. An non-leveling asbestos-free joint compound or stucco composition comprising the following components in the indicated proportions: from about 3 to about 7 parts by weight of binder selected from the group consisting of latex binder and polyvinyl alcohol; from about 0.3 to about 1.5 parts by weight of water retention agent; from about 25 to about 36 parts by weight of filler selected from the group consisting of calcium carbonate, calcium sulfate, mica, talc, sericite and mixtures thereof; and from about 1 to about 5 parts by weight of hollow silica particles, said hollow silica particles having an average diameter of from about 25 microns to about 100 microns and a density of from about 0.10 g/cc to about 0.20 g/cc.

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**4,391,648**

## PARTICULATE PIGMENT COMPOSITIONS

**Richard M. Ferrill, Jr., Glens Falls, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation of Ser. No. 179,849, Aug. 20, 1980, abandoned, which is a continuation of Ser. No. 966,439, Dec. 4, 1978, abandoned. This application Jun. 18, 1981, Ser. No. 274,972**
**Int. Cl.³ C09C** *1/20, 3/68*
**U.S. Cl. 106—308 M** **5 Claims**

1. A solid particulate granular pigment composition which is readily dispersible in oleoresinous vehicle systems and consists essentially of from 25 to 95% by weight of at least one pigment; from 1 to 15% of a cationic surfactant or blend of surfactants; and from 5 to 75% of a water-insoluble, non-crystalline, friable, thermoplastic polyester resin having a hydroxyl value of 75–150 mg. KOH/gram of resin and a Ring and Ball softening point of from about 65° to 100° C. which polyester resin is the condensation product of phthalic anhydride, p-tert. butylbenzoic acid and trimethylol ethane.

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**4,391,649**

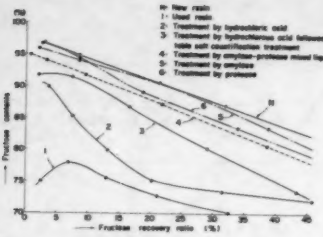
## PROCESS FOR REGENERATING A STRONGLY ACIDIC CATION EXCHANGE RESIN

**Hiroshi Shimizu, Tokyo; Sigeo Sakai, Niiza; Fumihiko Matsuda, Tokorozawa, and Reiko Matsumoto, Tokyo, all of Japan, assignors to Japan Organo Co., Ltd., Tokyo, Japan**

**Filed Jun. 30, 1981, Ser. No. 279,217**
**Claims priority, application Japan, Sep. 26, 1980, 55-132988**
**Int. Cl.³ B01J** *49/00*
**U.S. Cl. 127—46.2** **16 Claims**

9. A process for regenerating a strongly acidic cation exchange resin having polysaccharides and/or proteins deposited

on surfaces thereof comprising contacting said strongly acidic cation exchange resin with an enzyme solution whereby each



of said polysaccharides and/or proteins is removed from the surfaces of said resin.

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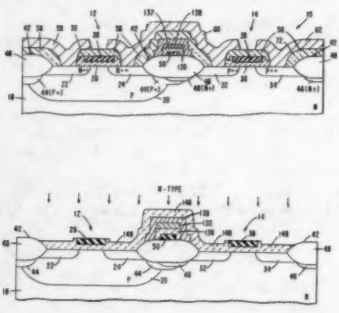
**4,391,650**

## METHOD FOR FABRICATING IMPROVED COMPLEMENTARY METAL OXIDE SEMICONDUCTOR DEVICES

**Robert F. Pfeifer, and Murray L. Trudel, both of Centerville, Ohio, assignors to NCR Corporation, Dayton, Ohio**

**Filed Dec. 22, 1980, Ser. No. 218,891**
**Int. Cl.³ H01L *21/22, 21/265***
**U.S. Cl. 148—1.5** **8 Claims**



**1.** A process for forming a high packing density CMOS integrated circuit device from a structure including a body of a semiconductor material having a first active region of a first conductivity type, a second active region of a second conductivity type, and a thin silicon dioxide layer formed on said body encompassing a gate region within each of said active regions, said process comprising the steps of:

forming a layer of polysilicon over said thin silicon dioxide layer;

patterning said polysilicon into gate electrodes corresponding to said first and second active regions;

doping the substrate independently of said gate electrodes to form the source and drain of a first conductivity type in said second active region and a source and drain of the second conductivity type in said first active region such that said sources and drains are aligned with their corresponding gates;

doping said polysilicon gates with impurities of a single conductivity type independently of said sources and drains

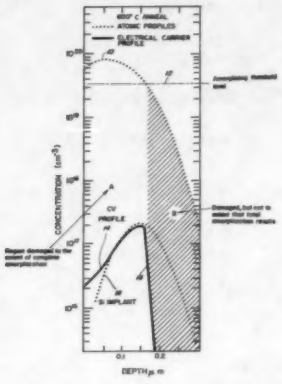
whereby said device is free of dopant penetration from said gates into said substrate through said thin oxide layer.

**4,391,651**

## METHOD OF FORMING A HYPERABRUPT INTERFACE IN A GaAs SUBSTRATE

**Max N. Yoder, Falls Church, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Oct. 15, 1981, Ser. No. 311,709**
**Int. Cl.³ H01L *21/263, 21/26, 21/203***
**U.S. Cl. 148—1.5** **6 Claims**



**1.** An improved method of forming, in the fabrication of a desired FET, a hyperabrupt interface in a GaAs substrate, wherein said improved method comprises the steps of:

preamorphizing a region of said GaAs substrate to a predetermined depth;

implanting donor ions in said preamorphized region to a depth of 90% of the predetermined depth thereby creating a retrograde donor ion concentration profile with depth; and

annealing said GaAs substrate to activate said implanted donor ions, thereby creating an electrically active region and an underlying amorphous region in said preamorphized region and forming said hyperabrupt interface therebetween.

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**4,391,652**

## SURFACE TREATMENT FOR ALUMINUM AND ALUMINUM ALLOYS

**Narayan Das, Westmont, and Joy M. Schaefer, Park Ridge, both of Ill., assignors to Chemical Systems, Inc., Chicago, Ill.**

**Filed Jan. 29, 1982, Ser. No. 343,992**
**Int. Cl.³ C23F *7/00***
**U.S. Cl. 148—6.15 R** **15 Claims**

**1.** An aqueous coating solution for forming a coating on aluminum and aluminum alloy surfaces consisting essentially of at least about 0.025 grams/liter of zirconium, at least about 0.050 grams/liter of fluoride ion, at least about 0.025 grams/liter of nickel and sufficient acid to adjust the pH to the range of about 1.2 to about 2.5.

4,391,653

## PROCESS FOR PRODUCING COLD ROLLED STEEL STRIP HAVING EXCELLENT MECHANICAL STRENGTH AND USEFUL FOR MOTOR VEHICLES

Hiroshi Takechi; Hiroshi Katoh, both of Kisarazu; Kazuo Koyama, Kimitsu, and Kazuhide Usami, Kisarazu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Sep. 15, 1981, Ser. No. 302,450
Claims priority, application Japan, Sep. 25, 1980, 55/132344
Int. Cl.³ C21D 8/04
U.S. Cl. 148—12 C 5 Claims

1. A process for producing a high strength cold rolled steel strip useful for motor vehicles, comprising the steps of:

preparing a steel slab comprising

0.008 to 0.020% by weight of carbon,

0.01 to 0.45% by weight of manganese,

0.05 to 0.10% by weight of phosphorus,

0.005 to 0.050% by weight of acid-soluble aluminum,

and the balance consisting of iron and unavoidable impurities in which nitrogen is limited to a content of 40 ppm or less;

heating said steel slab to a temperature of 1200° C. or less;

hot rolling said heated steel slab at a temperature not lower than the $Ar_3$ point of said steel;

descaling said resultant hot rolled steel strip;

cold rolling said descaled steel strip at a rolling reduction of 65% or more;

continuously annealing said cold rolled steel strip by heating it to a temperature of from 700° to 900° C., by soaking the steel strip for 20 seconds to 3 minutes and by cooling the steel strip at a cooling rate of from 5° C./sec to 30° C./sec in the temperature range of 650° C. or more and then, at a cooling rate of more than 30° C./sec in the temperature range of below 650° C.;

overaging said annealed steel strip at a temperature of from 320° to 450° C. for 1 to 10 minutes;

cooling said overaged steel strip to the ambient temperature, and;

temper-rolling said cooled steel strip at the ambient temperature.

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4,391,654

## METHOD OF THERMO-CHEMICAL TREATMENT OF CUTTING TOOLS AND PLASTIC WORKING TOOLS

Jerzy Wyszkowski; Wladyslaw Panasiuk; Stanislaw Koprek, and Andzei Piechal, all of Warsaw, Poland, assignors to Instytut Mechaniki Precyzyjnej, Warsaw, Poland

Filed Jun. 22, 1981, Ser. No. 275,709
Claims priority, application Poland, Jul. 4, 1980, 225459
Int. Cl.³ C23F 7/04
U.S. Cl. 148—16.6 4 Claims

1. A method of thermo-chemically treated cutting tools or plastic working tools made of high-speed, high-chromium and ledeburitic steels comprising the steps of

forming an oxide layer on the surfaces of said tools, said layer having a thickness of being not greater than 6 μm, and said layer being produced by oxidizing said tools in steam at a temperature within the range of 520 to 570 degrees Centigrade for 30 to 120 minutes, and

gas nitriding the oxidized tools, for a period of time of at least 15 minutes in duration, in an atmosphere of dissociated ammonia at a temperature of 520 to 580 degrees Centigrade and simultaneously subjecting the oxidized tools to oxidation, in steam consisting of 5 to 95 percent by volume of the whole gas atmosphere, during any arbitrary interval of time occurring during said period whereby the atmosphere of dissociated ammonia is obtained by dissociation of ammonia in the presence of steam.

4,391,655

## TREATMENT FOR THE ALLEVIATION OF HIGH TEMPERATURE OXIDATION OF ALUMINUM

Michael E. Thurston; William A. Cassada, III, and Daniel J. Schardein, all of Richmond, Va., assignors to Reynolds Metals Company, Richmond, Va.

Filed Sep. 28, 1981, Ser. No. 306,484
Int. Cl.³ C21D 1/44
U.S. Cl. 148—20.6 12 Claims

1. A method for the control of high temperature oxidation in aluminum materials to be subjected to solution heat treatment consisting of exposing the surface of the aluminum material to an aqueous solution consisting of a transition metal chloride prior to said solution heat treatment.

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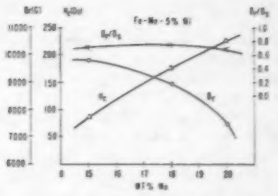
4,391,656

## ISOTROPIC AND NEARLY ISOTROPIC PERMANENT MAGNET ALLOYS

Sungho Jin, Gillette, and Thomas H. Tiefel, Rockaway, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 197,970, Oct. 17, 1980, Pat. No. 4,340,435.
This application May 3, 1982, Ser. No. 374,310
Int. Cl.³ H01F 1/02
U.S. Cl. 148—102 3 Claims



1. Method for making a body of a magnetically isotropic or nearly isotropic permanent magnet alloy, said method comprising (1) annealing a metallic body at a temperature in the range of 800–1200 degrees C., said body comprising an amount of at least 95 weight percent Fe, Mo, and Ni, Mo being in the range of 10–40 weight percent of said amount, and Ni being in the range of 0.5–15 weight percent of said amount, (2) rapidly cooling said body, and (3) aging said body at a temperature in the range of 500–800 degrees C. for a time in the range of 5 minutes to 10 hours, whereby magnetic coercivity of said alloy is in the range of 50–500 oersted, magnetic remanence of said alloy is in the range of 7000–14000 gauss, and magnetic squareness of said alloy is less than 0.9.

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4,391,657

## MANUFACTURE OF NIOBIUM-ALUMINUM SUPERCONDUCTING MATERIAL

William L. Feldmann, Bernardsville; John M. Rowell, Berkeley Heights, and Paul H. Schmidt, Chatham, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jul. 17, 1981, Ser. No. 284,523
Int. Cl.³ H01L 39/24
U.S. Cl. 148—133 13 Claims

1. Method for making a $Nb_3Al$ superconducting shaped article which is superconducting at a temperature which is greater than or equal to 10 degrees Kelvin,

said method comprising heating a precursor body consisting essentially of a supporting component and a supported component,

said supporting component comprising a first element which is niobium and at least one additional element whose chemical affinity for oxygen is greater than the chemical affinity between aluminum an oxygen,

said supported component comprising aluminum oxide, and heating being at a temperature in the range of from 800 to 1600 degrees Celsius and for a time which is sufficient to reduce the aluminum oxide and to form an oxide of at least a portion of said at least one additional element, whereby at least a layer consisting essentially of superconducting niobium-aluminum is formed.

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**4,391,658**

## METHOD FOR MANUFACTURING SEMICONDUCTOR SUBSTRATE

**Syoiti Kitane; Shigeru Honjo, both of Himeji; Kuniyoshi Ohe, and Fumio Tobioka, both of Hyogo, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Japan**

**Filed Dec. 9, 1981, Ser. No. 329,060**
**Claims priority, application Japan, Dec. 12, 1980, 55-175305**
**Int. Cl.³ H01L *21/225***
**U.S. Cl. 148—188** **5 Claims**

1. A method for manufacturing a semiconductor substrate comprising the steps of:

forming on all surfaces of a raw semiconductor substrate an impurity layer of the same conductivity type as the raw semiconductor substrate and forming a first insulating film on the entire impurity layer;

removing those portions of the impurity layer and first insulating film which are formed on one major surface of the raw semiconductor substrate and finishing the exposed major surface of the raw semiconductor substrate, thus providing a mirror surface;

forming a second insulating film on the mirror surface of the raw semiconductor substrate and on the remaining first insulating film, forming a protective film on the entire second insulating film and forming a third insulating film on the entire protective film, thus providing a laminate;

holding the laminate side by side together with other laminates provided in the same way;

heating the laminates thus held, in an oxidizing atmosphere, thereby diffusing the impurity from the impurity layers into the raw semiconductor substrates to form diffusion layers in the raw semiconductor substrates; and

removing the first insulating film, second insulating film, protective film and third insulating film from each of the laminates.

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**4,391,659**

## EXPLOSIVE

**Jeremy G. B. Smith, Edenvale, South Africa, assignor to AECI Limited, Johannesburg, South Africa**

**Filed May 17, 1982, Ser. No. 378,719**
**Claims priority, application South Africa, May 26, 1981, 81/3531**
**Int. Cl.³ C06B *45/00***
**U.S. Cl. 149—2** **19 Claims**

1. An emulsion explosive of the water-in-fuel type which has as its discontinuous phase an oxidizing salt-containing component, and as its continuous phase a fuel component which is immiscible with the discontinuous phase, the continuous phase comrising at least a proportion of a polymeric dispersion.

**4,391,660**

## COPPER CONTAINING BALLISTIC ADDITIVES

**Robert C. Corley, Lancaster, Calif., and Frederick F. Myers, Jr., Manassas, Va., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.**

**Filed Sep. 10, 1981, Ser. No. 300,761**
**Int. Cl.³ C06B *45/10***
**U.S. Cl. 149—19.9** **9 Claims**

1. In a solid propellant formulation composed of a plastic binder component, a fuel component and an oxidizer component, the improvement which comprises the addition of a minor amount of a copper containing additive selected from the groups consisting of copper thiocyanate, copper ferrocyanide, 2,5-dihydroxy benzoquinone copper (II) polymer, an N-substituted benzotriazol copper acetate complex, a copper Schiff Base with salicylidene ethylene diamine, copper (II) [(salicylaldehyde) (2,4-pentanedione)], and tetrachloro u-[bis dimethyl glyoxamate copper (II)]di copper (II).

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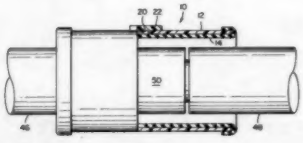
**4,391,661**

## CABLE COVERING METHOD USING AN EXPANDABLE INSULATIVE SLEEVE

**Hyman Izraeli, West Caldwell, N.J., assignor to Thomas & Betts Corporation, Raritan, N.J.**

**Filed Feb. 2, 1981, Ser. No. 231,225**
**Int. Cl.³ H01B *13/22***
**U.S. Cl. 156—49** **3 Claims**




1. A method for providing an insulative covering for an electrical cable comprising the steps of:

(a) selecting an expandable electrically insulative sleeve member to have relaxed cross-section less than the cross-section of said cable;

(b) disposing said sleeve member interiorly of an outer member of self-sustaining hollow configuration of cross-section greater than such cable cross-section and placing said sleeve member and said outer member in fluid-sealed relation;

(c) introducing a pressurized fluid medium interiorly of said sleeve member and thereby expanding said sleeve member into contiguous relation with said outer member;

(d) terminating the introduction of said pressurized fluid medium and maintaining the contiguous relation of said sleeve member and said outer member in the absence of said pressurized fluid medium;

(e) arranging said sleeve member and said outer member in circumscribing relation to said cable;

(f) interrupting said fluid-sealed relation of said sleeve member and said outer member to permit said sleeve member to collapse upon said cable; and

(g) removing said outer member from said sleeve member.

## 4,391,662
## METHOD OF AND MEANS FOR PROVIDING AN EFFECTIVE THERMOPLASTIC ADHESIVE CONNECTION OR SEAL USING THERMOCHROME DYE

Peter Mauthe, Neu-Ulm, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft, Schaan, Liechtenstein

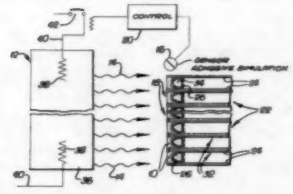
Filed Dec. 8, 1981, Ser. No. 328,507
Claims priority, application Fed. Rep. of Germany, Dec. 17, 1980, 3047635
Int. Cl.³ G01N *31/22*; G01K *11/12*
U.S. Cl. 156—64 10 Claims

1. A method of making adhesive connections or seals using a thermoplastic adhesive where the thermoplastic adhesive remains at or above the minimum temperature required for satisfactory moistening the materials to be glued or sealed and indicating when the temperature of the thermoplastic material falls below the minimum temperature required for satisfactory moistening comprising the steps of using a solid thermoplastic adhesive containing at least one thermochrome dye showing a color change in the temperature range between the minimum temperature necessary for satisfactory moistening of the materials to be glued or sealed by the thermoplastic adhesive and a temperature approximately 20° above the minimum temperature at which a satisfactory moistening occurs, and heating the solid thermoplastic adhesive into a molten state where the molten thermoplastic is sufficiently viscous and is heated to a temperature at least approximately 20° above the minimum temperature necessary for satisfactory moistening and noting any color change in the thermoplastic adhesive indicating that the thermoplastic adhesive is approaching the minimum temperature necessary for satisfactory moistening.

## 4,391,663
## METHOD OF CURING ADHESIVE

Charles G. Hutter, III, 4110 County Line, Carson City, Nev. 89701

Continuation of Ser. No. 213,312, Dec. 5, 1980, abandoned. This application Jun. 23, 1982, Ser. No. 391,238
Int. Cl.³ C03C *27/00*
U.S. Cl. 156—64 10 Claims




1. A method of curing a heat curable substance, comprising the steps of:

positioning a heat sensor adjacent an exposed surface of the substance for responding to radiation heat energy to generate a signal representative of the temperature level of the exposed surface of the substance;

irradiating the exposed surface of the substance and the heat sensor with radiation heat energy;

removing the radiation heat energy from the substance and the heat sensor in response to the heat sensor signal when the signal is representative of the exposed surface reaching a predetermined maximum temperature level;

allowing the exposed surface of the substance to cool to a predetermined lower temperature level;

reapplying the radiation heat energy in response to the heat sensor signal when the signal is representative of the exposed surface of the substance reaching the predetermined lower temperature level to reheat the exposed surface to the predetermined maximum temperature level; and

repeating said removing and said reapplying steps in sequence until the surface of the substance opposite the exposed surface is cured.

## 4,391,664
## PROCESS FOR FIXING TILES IN POSITION

Wilhelm Kramer, Linz, Fed. Rep. of Germany, assignor to Schmelzbasaltwerk Kalenborn, Dr. Ing. Mauritz KG, Kalenborn bei Linz, Fed. Rep. of Germany

Filed Sep. 2, 1980, Ser. No. 183,228
Claims priority, application Fed. Rep. of Germany, Feb. 26, 1980, 3007147
Int. Cl.³ E04B *2/00*; B05D *5/12*
U.S. Cl. 156—71 6 Claims

1. A process for fixing in position on a cement mortar coated supporting structure wear-resistant lining tiles of ceramic, fused mineral and metallic material for highly abrasive bulk material such as coal ores and rock, said process comprising:

cleaning the back side to be coated of each of said tiles,

applying an epoxy-containing coating to the cleaned back side of said tiles, said epoxy-containing coating having a thickness of 1.5–2 mm and consisting of a resin mixture and a curing agent mixed at a ratio of 100 to 17, the curing temperature for said epoxy-containing coating being in the range of 290–310 K.",

the resin mixture consisting of

36.9 parts by weight epoxy resin,

25.2 parts by weight of fine sand,

34.9 parts by weight of quartz sand powder,

1.0 parts by weight of thixotropic agent, and

2.0 parts by weight of conducting carbon stock,

dusting and rolling in the epoxy-containing coated back side of said tiles a layer of material having an affinity for cement mortar, the material being selected from the group consisting of quartz sand, lavalite and broken expanded clay, with a grain size of 1–3 mm,

said material being rolled into the epoxy-containing coated back side of said tiles at a pressure of 1 to 2 N/square mm, and

following the rolling in of said material, hardening said epoxy-containing coating, placing and fixing in position said coated tiles on the cement mortar coated supporting structure and filling up the spaces between said tiles by a pointing compound, so as to produce a high shear strength in said tiles.

5. The process as claimed in claim 1, in which said tiles are fixed to a cement mortar composition having plastic material additives that increase water retention, strength and adhesive properties of the mortar composition.

## 4,391,665
## METHOD OF MAKING PILE MATERIAL

Paul B. Mitchell, Jr., 2003 Ravenwood Dr., Collinsville, Ill. 62234, and Paul B. Mitchell, Box 443, Bryson City, N.C. 28713

Filed Aug. 10, 1981, Ser. No. 291,564
Int. Cl.³ B32B *1/00*, *5/00*; D04H *11/00*
U.S. Cl. 156—72 6 Claims

1. A method of making pile material comprising pile strands or the like arranged in side-by-side relation, and a backing member bonded to the strands, said method comprising the steps of:

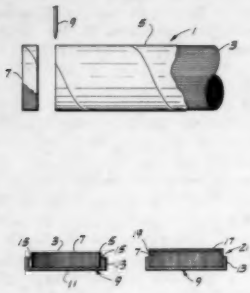
(a) providing a bundle of pile strands, the strands extending in side-by-side relation and being held in pressurized engagement with each other by a wrapper surrounding the strands;

(b) cutting the bundle including the the wrapper into slices, each slice having a portion of the wrapper thereon;

(c) positioning each slice with the said portion of the wrapper thereon in a form having a wall surrounding the slice, the form being of generally the same sectional shape as the slice but of slightly larger sectional area than the slice for

providing a space between the periphery of the slice and the wall of the form;

(d) removing the said portion of the wrapper from the slice, thereby allowing the pile strands to expand laterally out-



wardly into engagement with the wall of the form, the form thus serving to hold the pile strands; and

(e) bonding a backing member to the pile strands on one face of the slice.

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**4,391,666**

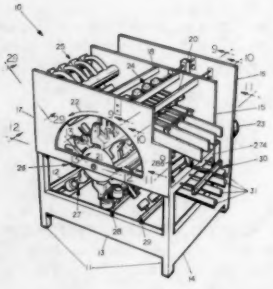
**CONTAINER MANUFACTURING MACHINE**

**Martin Mueller, Wonder Lake, Ill., assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Filed Oct. 19, 1981, Ser. No. 313,075**

**Int. Cl.³ B29C *27/20*; B32B *31/00***

**U.S. Cl. 156—84** **35 Claims**



1. An apparatus for the manufacture of a container of heat-shrinkable thermoplastic material comprising sleeve winding means for forming an open ended sleeve with a liquid impervious side seam, drum means mounted for rotation about its longitudinal axis and supporting a plurality of container mandrels which rotate about their own axis in synchronization with the rotation of said drum means, means for moving said sleeve in a longitudinal direction along the surface of said mandrel means, heat dispensing means positioned adjacent said drum and mandrel means for heat softening and shrinking at least a portion of said sleeve into partial conformity with the container mandrel supporting said sleeve, means for forming a portion of the heat softened sleeve into a partial end closure for said container and container removal means for removing said container from said mandrel.

**4,391,667**

**METHOD OF PREPARING CELLS TO ENABLE ONE FLUID TO BE AFFECTED BY ANOTHER FLUID**

**Hakan Vangbo, Järfälla; Bertil Lundin, Sollentuna, and Öivind Moklint, Varby, all of Sweden, assignors to Aktiebolaget Carl Munters, Sollentuna, Sweden**

**Filed Apr. 23, 1981, Ser. No. 256,807**

**Claims priority, application Sweden, Apr. 25, 1980, 8003175**

**Int. Cl.³ B31F *1/20*; B32B *3/28***

**U.S. Cl. 156—205** **13 Claims**

1. A method of manufacturing a cell of the type having a plurality of passages therethrough and further of the type in which one or more fluids may selectively be passed through the passages, said method comprising the steps of:

forming a plurality of thin membranes from mineral fibres, said fibres having a filament diameter in the range of about 3 to 20 micrometers and being loosely felted together,

corrugating at least some of the membranes, adjacent membranes being bonded to each other by a bonding agent whereby the corrugations form with adjacent membranes the passages of the cell,

adding a fine powder filler to the formed membranes in an amount which by weight exceeds the weight of said formed membranes whereby the mineral fibres are embedded with the filler to form therewith a composite member and to provide said membranes with an increased active surface area, and

impregnating the formed powder filled member with an inorganic binder whereby the bound powder filler forms a load-bearing layer which is cohesive throughout the increased surface area of said membranes and through the cross-section thereof and whereby said fibres serve as reinforcement for said composite reinforced member.

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**4,391,668**

**MIXED OXIDE OXYGEN ELECTRODE**

**William A. Armstrong, Ottawa, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Ottawa, Canada**

**Filed Apr. 22, 1981, Ser. No. 256,665**

**Claims priority, application Canada, Sep. 2, 1980, 360068**

**Int. Cl.³ C09J *5/02*; C25D *3/12***

**U.S. Cl. 156—308.2** **9 Claims**

8. A method for the preparation of a nickel/cobalt oxide impregnated nickel plaque material, comprising the steps of:

(a) providing a substantially oxide-free sintered nickel plaque material;

(b) dipping the nickel plaque in an aqueous solution of cobalt nitrate;

(c) drying the cobalt nitrate impregnated plaque so formed;

(d) heat treating at about 200° to 250° C. for about 1 to 8 hours, to form the nickel/cobalt oxide impregnated nickel plaque material;

(e) covering one side of the plate with a polytetrafluoroethylene membrane;

(f) cold pressing the membrane onto the plate;

(g) exposing the other side of the plate to aqueous cobalt nitrate and polytetrafluoroethylene solution;

(h) drying the plate;

(i) removing the polytetrafluoroethylene covering from said one side of the plate;

(j) heat treating the plate at about 250° C. for about 3 hours, to form a plate wet-proofed only on said other side of the plate;

(k) covering the wet-proofed side of the plate with a polytetrafluoroethylene membrane; and

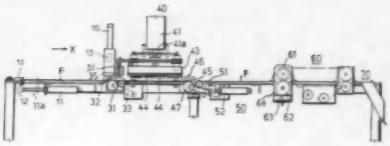
(l) hot-pressing the membrane onto the plate.

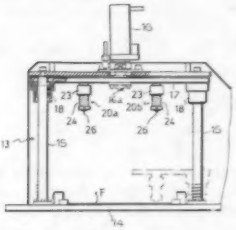
**4,391,669**

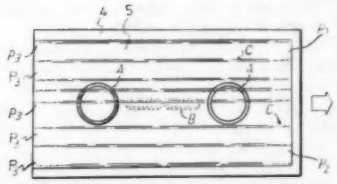
## DEVICE FOR MAKING RECORDING DISC CARTRIDGE

**Tohru Yamakawa, Muko, and Kozi Akiyama, Joyo, both of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan**

**Filed Jan. 23, 1981, Ser. No. 227,982**
**Claims priority, application Japan, Jan. 25, 1980, 55-7914**
**Int. Cl.³ B32B *31/00*; G05G *15/00*; B31F *1/00***
**U.S. Cl. 156—539** **5 Claims**







1. A device for making a magnetic recording disc cartridge having a cover jacket in the form of an enclosure with a drive shaft insertion hole and a recording heat access hole defined therein and a magnetic recording disc which is rotatably enclosed in the enclosure, said cover jacket being composed of a cover sheet of a generally elongated rectangular shape with a liner laid on the surface of the cover sheet, said jacket being formed by folding the cover sheet with a liner along a line crossing in a direction of the short side of the cover sheet in such a manner that both portions of the liner positioned on both sides of the folded liner are opposed to each other in the enclosure, said device comprising;

a feed table for placing the cover sheet with the liner thereon;

first adhering means having a plurality of heating chips for adhering said liner to the cover sheet by heat melting adhesion, said heating chips being vertically movably disposed above the feed table;

first transferring means for transferring the cover sheet with the liner from an initial position remote from the first adhering means on the feed table to such a position that a front peripheral edge portion of the liner is placed below the heating chips of the first adhering means;

means for reciprocably moving the heating chips in a vertical direction, whereby said cover sheet with the liner is transferred to such a position that the front peripheral edge portion of the liner is placed below the heating chips of the first adhering means by said first transferring means and in turn the heating chips of the first adhering means are lowered to contact on the liner from above to preliminarily adhere the liner to the cover sheet by a plurality of spots on the front peripheral edge thereof;

second adhering means for adhering the liner to the cover sheet by heat melting adhesion around the respective patterns of the drive shaft insertion hole and the recording head access hole, said second adhering means including a plurality of heating chips for adhering the liner on the cover sheet on a rear peripheral edge of the liner, said adhering of the respective patterns of the drive shaft insertion hole and the recording head access hole and the adhering of the rear peripheral edge of the liner on the cover being performed simultaneously;

second transferring means for transferring the cover sheet with the liner to a position below the second adhering means after said preliminary adhering is perfected;

third adhering means for adhering the liner to the cover sheet by heat melting adhesion over a plurality of predetermined linear patterns on the liner; and

third transferring means for transferring the cover sheet with the liner from the second adhering means to the third adhering means.

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**4,391,670**

## LOW ENERGY TMP FURNISH OF IMPROVED STRENGTH BY OZONATION AND PRESS DRYING

**Richard B. Phillips, Tuxedo Park, N.Y., assignor to International Paper Company, New York, N.Y.**

**Filed Oct. 7, 1981, Ser. No. 309,295**
**Int. Cl.³ D21F *11/02***
**U.S. Cl. 162—12** **11 Claims**

1. A process for the preparation of linerboard from thermomechanical, high temperature mechanical and semichemical mechanical pulps comprising:

(a) treating mechanical pulp selected from thermomechanical, semi-chemical mechanical, high temperature mechanical, or mixtures thereof with ozone;

(b) forming a sheet having from about 30% to about 60% consistency from the ozone treated pulp of step a above; and

(c) press drying the sheet formed in step b above at high temperatures and pressure until at least about 10% to about 15% moisture content is attained.

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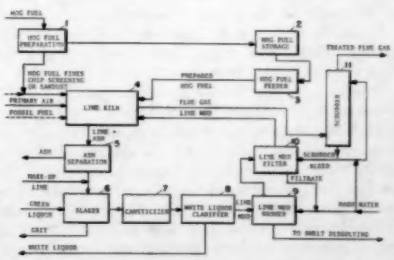
**4,391,671**

## METHOD OF PRODUCING LIME IN A ROTARY KILN

**Mahmoud K. Azarniouch, Montreal West, Canada, assignor to Pulp and Paper Research Institute of Canada, Pointe Claire, Canada**

**Filed May 27, 1981, Ser. No. 267,504**
**Int. Cl.³ C01F *11/06***
**U.S. Cl. 162—30.1** **5 Claims**



1. In a method of calcining lime mud or lime stone in a rotating kiln in which the lime mud or lime stone is fed into the

cold end of said kiln and is calcined by the heat produced by burning fossil fuel at the hot end of said kiln, the improvement which comprises: preparation of biomass residues to produce a biomass residue substantially free from fines and suitable for feeding into said kiln; feeding said prepared biomass residues into the cold end of said kiln, along with the material to be calcined; combusting said residues in said kiln, generating heat in situ in said kiln, whereby the amount of fossil fuel burned to calcine said material is diminished.

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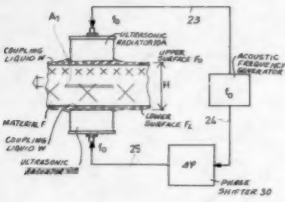
4,391,672

## METHOD USED IN PAPER MAKING FOR TREATMENT OF A WEAVE

**Antti Lehtinen, Jyväskylä, Finland, assignor to Valmet Oy, Finland**

**Filed Jul. 2, 1981, Ser. No. 279,748**
**Claims priority, application Finland, Mar. 16, 1981, 810812**
**Int. Cl.³ D21F 7/00**
**U.S. Cl. 162—192** **15 Claims**




1. A method used in paper making for treatment of a weave, board web, paper, and the like, said method utilizing frequency radiators arranged in the vicinity of a material to be treated and coupling liquid between the material to be treated and the radiators, said method comprising the steps of

arranging frequency radiators on opposite sides of the material to be treated, opposite each other, and with a mutual spacing which is only slightly larger than the thickness of the material to be treated;

feeding longitudinal acoustic vibrations to said radiators at the same frequency;

causing said opposed radiators to apply respective acoustic vibration fields to said material to be treated located between said radiators, the respective vibration fields having the same frequency and a phase difference with respect to each other; and

regulating the phase difference of the vibrations fed to the opposed radiators to focus the most intensive region of action of a combination of said fields of vibration in the thickness direction of the material to be treated.

11. Paper making apparatus for treatment of a weave, board web, paper, and the like, said apparatus comprising

frequency radiators positioned on opposite sides of a material to be treated, opposite each other, and with a mutual spacing which is only slightly larger than the thickness of the material to be treated;

a frequency generator having a first terminal electrically connected to one of said frequency radiators on one side of said material and a second terminal, said generator producing longitudinal acoustic vibrations at said first and second terminals of the same frequency; and

a phase shifter connecting the second terminal of said frequency generator to another of said frequency radiators on the opposite side of said material for varying the difference of the vibrations fed to said radiators for focusing the most intensive area of a field of vibration combinations in said material in a manner whereby it has an effect upon a desired area of said material.

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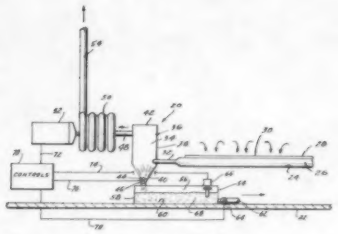
4,391,673

## BASEMENTLESS SEPARATOR SYSTEM

**Jeffrey B. Duncan, Argyle, and Joseph A. Bolton, Glens Falls, both of N.Y., assignors to Albany International Corp., Menands, N.Y.**

**Continuation of Ser. No. 123,098, Feb. 20, 1980, abandoned.**
**This application Sep. 16, 1981, Ser. No. 302,721**
**Int. Cl.³ D21F 1/48**
**U.S. Cl. 162—217** **20 Claims**



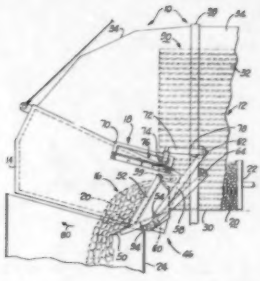

1. A basementless separator system for removing liquid from a liquid/gaseous mixture comprising; a separator including means for separating the liquid and gas therein, first conduit means communicating with the separator and with the source of the liquid/gaseous mixture, second conduit means communicating with the separator and with vacuum producing means to draw the liquid/gaseous mixture into the separator and to remove separated gas from the separator, first valve means on the separator in alignment with and connected to a liquid storage tank to open and close a discharge opening for separated liquid from the separator to be collected in the storage tank with the storage tank being subjected to the vacuum producing means when the first valve is open, second valve means on the storage tank to open and close a drainage opening in the tank to control drainage of liquid therefrom, level sensing means on the tank to indicate a predetermined level of collected liquid stored in the tank, and control means responsive to liquid collection in the tank to open and close the valves and periodically permitting liquid contained in the tank to drain under atmospheric conditions while the system is operating under vacuum and the absolute pressure is less than atmospheric.

11. A method of removing liquid separated from a liquid/gaseous mixture by use of a basementless separator system comprising; passing the liquid/gaseous mixture into a separator for separating the liquid and gas therein by applying vacuum to the separator and the source of a liquid/gaseous mixture to draw the liquid/gaseous mixture into the separator and remove separated gas from the separator, opening and closing a first valve at a discharge opening in the separator to control delivery of separated liquid from the separator to a liquid storage tank connected therewith for collection therein with the storage tank being subjected to vacuum when the first valve is open, opening and closing a second valve at a drainage opening in the storage tank to control drainage of collected liquid therefrom, sensing the level of liquid in the tank to indicate a predetermined level of collected liquid in the tank, and controlling the opening and closing of the valves responsive to the liquid condition in the tank to periodically permitting liquid contained in the tank to drain under atmospheric conditions while the system is operating under vacuum and the absolute pressure is less then atmospheric.

## 4,391,674
## COKE DELIVERY APPARATUS AND METHOD

Rolf Velmin; Michael S. Kovatch, both of Lakewood, and Gus H. Mautz, Jr., Westlake, all of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio

PCT No. PCT/US80/00470, § 371 Date Feb. 17, 1981, § 102(e) Date Feb. 17, 1981
PCT Filed Apr. 29, 1980, Ser. No. 270,529
Int. Cl.³ C10B 33/00, 33/14, 45/02
U.S. Cl. 201—41 24 Claims



1. A coke delivery apparatus for use in the transfer of coke from a coke oven to a quench car comprising;

(a) a movable hood structure adapted for movement when in use from a fume confining coke delivery position to a storage position and return;

(b) a chute structure adapted when in use to be moved from a coke guiding position to a storage position and return, said chute structure having a guiding portion for contacting and guiding the coke; and,

(c) a force transmitting structure interconnection assembly operably connected to each of the structures and adapted to transmit motion producing forces from one structure to the other when the one structure is driven from one of its said positions to the other, the motion of said chute structure in moving toward its storage position having both rotational and translational components which dispose said guiding portion in a position facing away from the coke oven.

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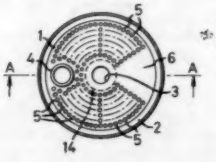
## 4,391,675
## SIEVE PLATES AND DISTILLATION COLUMNS

Malcolm Lynn, Preston, near Hull, and Peter E. May, Keyingham, both of England, assignors to BP Chemicals Limited, London, England

Filed Jan. 5, 1982, Ser. No. 337,324
Claims priority, application United Kingdom, Jan. 8, 1981, 8100606; Oct. 3, 1981, 8129924
Int. Cl.³ B01D 3/14
U.S. Cl. 202—158 10 Claims



3. A distillation column which is provided with a plurality of spaced sieve plates, characterised in that the sieve plates are of polymeric material and are mounted on a central shaft coaxial with the column, said sieve plate comprising:

(a) a circular base portion provided with

(i) a central axial aperture adapted to receive the shaft,

(ii) an additional aperture spaced from the central aperture and capable of receiving a tubular member acting as a weir and a downcomer, and

(iii) a plurality of perforations such that the perforations represent in total a free area of between 3 and 20%, the perforations having a uniform average diameter between 0.6 and 4.0 mm,

(b) a flexible, flared-lip portion around the circumference of the base providing sealing contact with the inner walls of the column and providing a reservoir for downcoming liquid, and

(c) means for retaining the plate on the shaft.

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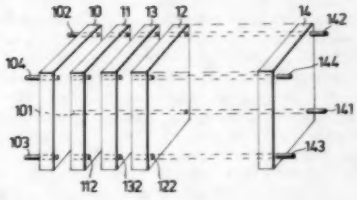
## 4,391,676
## ARRANGEMENT FOR PASSING A FIRST LIQUID CLOSE TO, BUT WITHOUT MIXING IT WITH A SECOND LIQUID, FOR EXAMPLE AN ARRANGEMENT FOR SEA WATER DESALINATION

Finn Torberger, Örnstigen 2, 183 50 Täby, Sweden

PCT No. PCT/SE81/00076, § 371 Date Nov. 19, 1981, § 102(e) Date Nov. 19, 1981, PCT Pub. No. WO81/02729, PCT Pub. Date Oct. 1, 1981
PCT Filed Mar. 10, 1981, Ser. No. 325,430
Claims priority, application Sweden, Mar. 24, 1980, 8002233
Int. Cl.³ B01D 3/02
U.S. Cl. 202—173 3 Claims



1. An arrangement providing a first liquid to flow close to a second liquid but without the liquids being intermixed, for example for the recovery of freshwater by distillation of sea water and for the transfer of heat from a relatively warm liquid to a relatively cold liquid, comprising:

A. a first plurality of plates carrying the first liquid;

B. a second plurality of plates carrying the second liquid, the second plurality of plates being placed interleaved between but separated from the first plurality of plates; and

C. separating pieces located between and separating the first and second plurality of plates from one another, each separating piece including a frame which receives plate-shaped mutually plane-parallel partial pieces that include:

1. an outer porous and hydrophobic plastic diaphragm with void radii dimensioned to prevent the passage of liquid water through the plastic diaphragm at the hydrostatic pressures prevailing in the arrangement while rendering possible the passage of water vapor,

2. an outer thin plastic foil, and

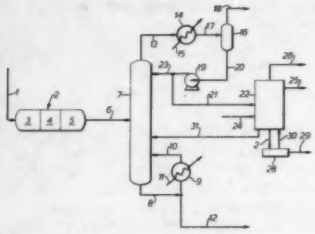
3. an intermediate distance network located between the diaphragm and the foil positioned and dimensioned to maintain an airgap therebetween so that the plastic diaphram will be supplied constantly with air and will be free of air depletion or partial filling of liquid,

said frame further being provided in its upper portion with inflow holes for air to pass to said airgap, and in its lower portion with outflow holes for water condensed in said airgap.

## 4,391,677
## PROCESS FOR PRODUCING SUBSTANTIALLY SULPHUR-FREE BUTENE-1

Norman Harris, Stockton-on-Tees, England; John F. Flintoff, Thousand Oaks, Calif., and John W. Kippax, Stockton on Tees, England, assignors to Davy McKee (Oil & Chemicals) Limited, London, England

Continuation of Ser. No. 132,293, Mar. 20, 1980, abandoned.
This application Aug. 27, 1981, Ser. No. 296,873
Claims priority, application United Kingdom, Mar. 21, 1979, 7910010; European Pat. Off., Nov. 28, 1979, 79302707.9
Int. Cl.³ B01D 3/14
U.S. Cl. 203—28 13 Claims



1. A process for the production of a substantially sulphur-free, butene-1 rich stream suitable for use as a hydroformylation feedstock from a butene-containing $C_4$ hydrocarbon feed stream containing a minor amount of at least one sulphurous component selected from hydrogen sulphide, carbonyl sulphide, methyl mercaptan and mixtures of at least one thereof with at least one higher boiling sulphurous compound, which comprises providing a desulphurization zone maintained under desulphurization conditions and containing a charge of at least one solid desulphurization medium capable of converting to higher boiling sulphurous compounds at least a portion of the hydrogen sulphide, carbonyl sulphide, and methyl mercaptan present in the feed stream and of absorbing or adsorbing substantially the remainder of any hydrogen sulphide, carbonyl sulphide and methyl mercaptan present in the feed stream, contacting the feed stream in the desulphurization zone with the solid desulphurization medium in the presence of from about 20 ppm up to about 1000 ppm water, passing thus treated feed stream, now essentially free from hydrogen sulphide, carbonyl sulphide and methyl mercaptan, but containing at least one higher boiling sulphurous compound, said at least one higher boiling compound having been produced in the desulphurization zone, to a distillation zone, recovering as a bottom product from the distillation zone a butene-2 rich stream containing said at least one higher boiling sulphurous compound, and recovering as an overhead product from the distillation zone a substantially sulphur-free, butene-1 rich stream.

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## 4,391,678
## METHODS OF MAKING INFRARED DETECTOR ARRAY COLD SHIELD

Wallace L. Freeman, Woodbridge, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 18, 1981, Ser. No. 322,503
Int. Cl.³ C25D 5/02, 5/00
U.S. Cl. 204—15 4 Claims

1. A method of making a cold shield for an infrared detector array, wherein the array consists of a plurality of detectors and connecting leads on one side of a substrate, wherein the method includes the steps of:

(a) coating said detectors, said leads, and one side of said substrate with a thin subcoat;

(b) depositing a relatively thin metal layer on said subcoat;

(c) electroplating a relatively thick metal on said thin metal layer;

(d) masking said thick metal layer in accordance with said

array and etching through said thick and thin metal layers to uncover the subcoat over the detectors and at least a portion of said leads; and

(e) removing the mask.

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## 4,391,679
## ELECTROLYTIC BATH AND PROCESS FOR THE DEPOSITION OF GOLD ALLOY COATINGS

Wolfgang Zilske, and Werner Kuhn, both of Hanau, Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Apr. 2, 1981, Ser. No. 250,142
Claims priority, application Fed. Rep. of Germany, Apr. 3, 1980, 3012999
Int. Cl.³ C25D 3/62
U.S. Cl. 204—43 G 20 Claims

1. A gold bath suitable for the deposition of high gloss and ductile gold alloy coatings consisting of either (1) water, potassium cyanoaurate (III), at least one alloying element selected from the group consisting of cobalt, nickel, indium, zinc, and cadmium in the form of a water soluble salt together with a hydrocarbyl amine, an aminocarboxylic acid, or a phosphonic acid which forms a complex with the alloying element and 20–200 g/l of sulfuric acid, phosphoric acid, citric acid or a mixture thereof, or (2) the gold bath (1) together with potassium dihydrogen phosphate, potassium hydrogen sulfate or potassium citrate, said bath having a pH of less than 3.

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## 4,391,680
## PREPARING ALKALI METAL HYDROXIDE BY WATER SPLITTING AND HYDROLYSIS

Krishnamurthy Mani, Denville, and Frederick P. Chlanda, Rockaway, both of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Dec. 3, 1981, Ser. No. 327,145
Int. Cl.³ C25B 1/16, 1/22
U.S. Cl. 204—98 16 Claims

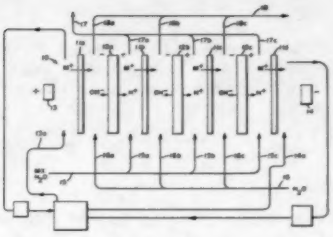
1. A process which comprises the steps:

(a) introducing aqueous alkali metal chloride solution into each first compartment between a cation membrane and a cation side of a bipolar membrane of an electrodialytic water splitter comprised of alternating cation and bipolar membranes, said membranes being positioned between an anode and a cathode,

(b) introducing into each second compartment between a cation membrane and an anion side of a bipolar membrane a liquid comprising water,

(c) passing a direct current through said water splitter thereby causing acidification of said aqueous alkali metal chloride solution and basification of said liquid comprising water and transfer of alkali metal cations from said aqueous salt solution to said liquid comprising water,

(d) withdrawing from said second compartments a liquid comprising aqueous alkali metal hydroxide,



(e) withdrawing from said first compartments an acidified aqueous salt solution comprising between about 0.6 and 13 moles HCl per 100 hundred moles alkali metal chloride, and

(f) feeding said acidified salt solution to the anode compartment of a diaphragm or membrane electrolytic cell.

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**4,391,681**

## METHOD OF INHIBITING FORMATION OF AND BREAKING OF MERCURY BUTTER IN CHLOR-ALKALI CELLS

**Susan Anderson, Lightwater; David E. Brown, Weybridge; David E. Graham, Fleet; Mahmood N. Mahmood, Walton-on-Thames, and Maurice C. M. Man, London, all of England, assignors to The British Petroleum Company p.l.c., London, England**

**Filed May 13, 1982, Ser. No. 377,606**

**Claims priority, application United Kingdom, May 14, 1981, 8114856; Mar. 19, 1982, 8208108**

**Int. Cl.³ C25B 1/16, 1/42**

**U.S. Cl. 204—99** **11 Claims**

1. A method of inhibiting the formation of and/or breaking of preformed mercury butter during electrolysis of alkali metal brines to produce chlorine and caustic alkali using a flowing mercury cathode which consists essentially of the following steps

(a) electrolysis of the brine in a electrolyser,

(b) removal of an alkali metal rich amalgam from the electrolyser,

(c) removal of the alkali metal from the rich amalgam in a denuder,

(d) withdrawal of the amalgam substantially reduced in alkali metal content from the denuder, and

(e) recirculation of the amalgam from step (d) into the electrolyser for step (a),

characterised in that an aqueous solution of a surfactant material capable of increasing the interfacial tension of the sodium amalgam-aqueous interface to and/or maintaining the interfacial tension of the sodium amalgam-aqueous interface at a value of at least 180 dynes/cm is introduced into the amalgram denuder so as to be in contact with the circulating mercury or amalgam.

**4,391,682**

## METHOD FOR ELECTROLYTIC PRODUCTION OF HYDROGEN

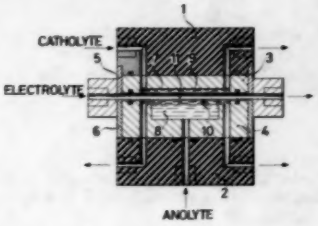
**Bernd D. Struck, Langerwehe; Robert Junginger, Böblingen, and Dagmar Boltersdorf, Düren, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich GmbH, Fed. Rep. of Germany**

**Filed Jan. 26, 1981, Ser. No. 228,796**

**Claims priority, application Fed. Rep. of Germany, Feb. 11, 1980, 3005032**

**Int. Cl.³ C25B 1/02, 1/22**

**U.S. Cl. 204—104** **5 Claims**




1. A process for electrolytic production of hydrogen in which hydrogen is cathodically evolved and sulfurous acid is anodically oxidized to sulfuric acid, utilizing an electrolyzer in which the anode chamber is separated from the cathode chamber by an intermediate chamber which is separated from the cathode chamber by a cation exchange membrane and from the anode chamber by a porous diaphragm, in which method a separating electrolyte is caused to flow through said intermediate chamber, and separate anodic and cathodic electrolytes are caused to flow respectively through the anode and cathode chambers, said method incorporating the improvement which consists in that:

in the electrolyte flowing in the anode chamber as well as in the electrolyte flowing in the cathode chamber, the concentration of sulfuric acid of at least 45% is provided, and the membrane separating the intermediate chamber from the cathode chamber is constituted of a material obtained by polymerization of styrol and divinylbenzol in the presence of polyvinyl chloride and the introduction of $SO_3H$ groups, and has a specific resistance in 55 wt.% sulfuric acid at 80° C., which is less than 30 ohm/cm.

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**4,391,683**

## MASK STRUCTURES FOR PHOTOETCHING PROCEDURES

**Reginald R. Buckley, Summit, and Frederick W. Ostermayer, Jr., Chatham, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

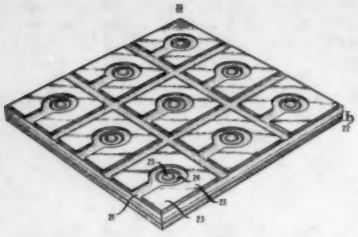
**Filed Sep. 10, 1982, Ser. No. 416,495**

**Int. Cl.³ C25F 3/12, 3/14**

**U.S. Cl. 204—129.3** **30 Claims**

1. A process for fabricating a device comprising the step of photoetching a surface where etching rate depends on radiation intensity incident on said surface characterized in that the

mask comprises alternating opaque and transparent areas and the mask is imaged onto the surface by an optical system with



aberrations and diffraction so as to produce radiation intensity on the surface that varies continuously with position.

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**4,391,684**

## METHOD OF MANUFACTURE OF AN ARTICLE HAVING INTERNAL PASSAGES

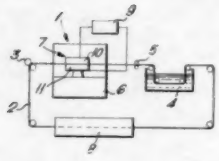
**John Goddard, Bristol, England, assignor to Rolls-Royce Limited, London, England**

**Filed Jul. 2, 1981, Ser. No. 279,782**

**Claims priority, application United Kingdom, Jul. 17, 1980, 8023395**

**Int. Cl.³ B23P** *1/00, 1/10*

**U.S. Cl. 204—129.4** **6 Claims**



1. A method of manufacture for a turbine blade having one or more internal passages therein comprising the steps of:

(a) making parts of the blade which when joined together complete the article, at least one of the parts having one or more of the passages at least partially defined in a surface thereof which is adapted to confront a matching surface of another of the parts,

(b) electro-lytically machining at least one of the two surfaces which are required to match by passing a linishing belt containing electrolyte between the two surfaces and in contact with both surfaces simultaneously, whereby one acts as a former for machining the other, and passing an electric current from one part to the other and through the electrolyte, and

(c) assembling the parts with the matching surfaces in confrontation and with the partially formed passages aligned and joining the surfaces together, thereby creating a hollow turbine blade.

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**4,391,685**

## PROCESS FOR ELECTROLYTICALLY PICKLING STEEL STRIP MATERIAL

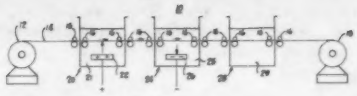
**George A. Shepard, Parma, and Philip C. Schillawski, Broadview Heights, both of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio**

**Filed Feb. 26, 1981, Ser. No. 238,430**

**Int. Cl.³ C25F** *1/06*

**U.S. Cl. 204—145 R** **6 Claims**

1. In a process for electrolytically pickling a steel strip material by subjecting the material to the action of direct current in a pickling bath which contains at least one neutral salt, the improvement comprising the steps of passing the direct current through the strip to be pickled as a conductor between a uni-



polar neutral salt pickling bath containing a cathode means an an acid anolyte bath containing an anode means, said acid anolyte bath being remote from said pickling bath.

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**4,391,686**

## ACTINIC RADIATION CURABLE FORMULATIONS

**Henry C. Miller, Laurel, Md., and Dennis D. Howard, Girard, Pa., assignors to Lord Corporation, Erie, Pa.**

**Continuation of Ser. No. 180,774, Aug. 25, 1980, abandoned, which is a continuation of Ser. No. 55,240, Jul. 6, 1979, abandoned. This application Sep. 16, 1981, Ser. No. 302,884**

**Int. Cl.³ C08F** *8/00*

**U.S. Cl. 204—159.15** **16 Claims**

1. A coating composition comprising

(a) a free radical-polymerizable material selected from the group consisting of monomers, polymers and mixtures thereof; and

(b) a photocatalyst system consisting essentially of

(i) as a photosensitizer compound, benzophenone; and

(ii) at least one photoinitiator selected from the group consisting of organic compounds characterized by the presence of at least one carbonyl group directly bonded through a carbon-oxygen bond to a peroxy oxygen atom.

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**4,391,687**

## PHOTOACTIVE MIXTURE OF ACRYLIC MONOMERS AND CHROMOPHORE-SUBSTITUTED HALOMETHYL-1-TRIAZINE

**George F. Vesley, Hudson, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Division of Ser. No. 121,404, Feb. 14, 1980, Pat. No. 4,330,590. This application Feb. 16, 1982, Ser. No. 348,655**

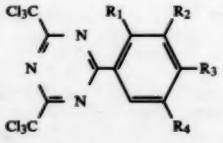
**Int. Cl.³ C08F** *2/50, 4/00*

**U.S. Cl. 204—159.16** **12 Claims**

1. A photoactive mixture comprising by weight

(a) 100 parts of a composition or a polymer of 50–100 parts of acrylic monomer and 0–50 parts of copolymerizable monoethylenically unsaturated monomer and

(b) 0.01 to 2 parts of a chromophore-substituted halomethyl-s-triazine of the formula



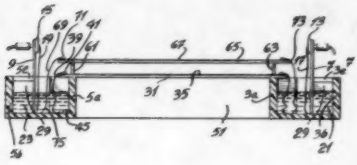
wherein $R_1$, $R_2$, $R_3$, and $R_4$ are independently hydrogen or alkoxy groups, and 1 to 3 of $R_1$, $R_2$, $R_3$, and $R_4$ are hydrogen.

**4,391,688**

## ELECTROPHORESIS SYSTEM FOR MULTIPLE AGAROSE SLAB GELS

Claude Hamelin, Montreal, Canada, assignor to Institut Armand-Frappier, Laval, Canada

Filed Jun. 2, 1981, Ser. No. 269,743
Int. Cl.³ B01D 13/02; G01N 27/26
U.S. Cl. 204—180 G 25 Claims



2. A method for the separation of multiple DNA samples on four different gel slabs which comprises:

providing first and second spaced apart elongated containers which can be set in parallel fashion at a variable distance from one another and each container having an inside and an outside partition and housing a removable platinum electrode;

adding a running buffer to each of said containers, said running buffer to contact said removable platinum electrode;

preparing at least four agarose gel slabs each having a row of wells formed therein, by pouring an agarose solution which has been equilibrated at 50° C. over at least four horizontal glass plates over each of which a well-forming comb has been placed parallel to the glass plate at a distance of about 2 mm from the surface of said glass plate;

introducing DNA samples into wells of each agarose gel slab;

arranging at least two agarose gel slab containing horizontal plates over said first and second containers by aligning both ends thereof respectively along the inner partitions of said first and second vessels;

covering each end of each of said at least two agarose gel slabs with one edge portion of a sheet of a two-ply paper wick, and allowing the other edge portion of each sheet of two-ply paper wick to dip into the respective running buffer which is present in said first and said second container;

disposing a pair of horizontal supporting rods spacedly above said at least two agarose gel slab containing horizontal plates which are directly arranged over said first and second containers;

arranging the remaining agarose gel slab containing horizontal plates over said supporting rods substantially in alignment with said at least two agarose gel slab containing horizontal plates;

covering each end of each of said remaining agarose gel slabs with one edge portion of a sheet of a six-ply paper wick, and allowing the other edge portion of each sheet of six-ply paper wick to dip into the respective running buffer which is present in said first and said second container;

connecting the removable platinum electrodes housed in each container to a suitable power supply and allowing electrophoresis to take place, and

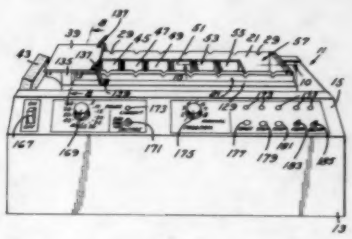
visualizing the localized bands produced in said agarose gel slab.

**4,391,689**

## AUTOMATED ELECTROPHORESIS AND STAINING APPARATUS AND METHOD

Tipton L. Golias, Beaumont, Tex., assignor to Helena Laboratories Corporation, Beaumont, Tex.

Filed Jun. 12, 1981, Ser. No. 273,162
Int. Cl.³ B01D 57/02
U.S. Cl. 204—180 G 30 Claims



1. An automated electrophoresis and staining apparatus comprising a cabinet having an apertured top wall;

an elongated housing spaced within said cabinet having upright front and rear walls, an end wall, a bottom wall and a platform between said front and rear walls overlying said bottom wall with said front and rear walls projecting above said top wall;

an electrophoresis chamber adapted to contain a buffer solution mounted upon said platform at one end of said housing;

and a series of vats mounted upon said platform arranged in a row and aligned with said chamber, adapted to contain respectively a liquid stain and a series of processing solutions;

said front and rear walls having transversely aligned longitudinally spaced pairs of notches in and along their upper edges;

said pairs of notches being over and in alignment with the centerline of each of said vats and chamber respectively;

a plate holder rack overlying said electrophoresis chamber including a horizontal frame and at its ends a pair of outwardly projecting inverted L-shaped arms respectively nested in the pair of notches in registry with said chamber;

and adapted for supporting one or a plurality of upright electrophoresis plates onto which has been applied a sample for electrophoretic fractionization;

said plates selected from the group consisting of cellulose acetate, cellulose esters, agarose, acrylamide gel and any other media suitable for electrophoresis;

said plate or plates being nested within said chamber within an electrophoretic circuit between a cathode and anode for a predetermined period;

and a power operated lift and transfer assembly within said cabinet outwardly of said front and rear walls adapted to progressively lift, transfer and lower said plate holder and plates from said chamber and progressively into each of said pairs of notches and underlying vats for a predetermined period successively in a linear stepping motion;

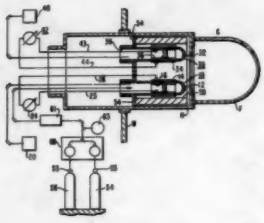
whereby said plates in an upright position are immersed into the fluids within said vats.

## 4,391,690

## APPARATUS FOR MONITORING $SO_2$ CONCENTRATIONS

Ching-Yu Lin, Monroeville, and William M. Hickam, Churchill, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 26, 1980, Ser. No. 181,340
Int. Cl.[3] G01N 27/58
U.S. Cl. 204—412 1 Claim



1. Apparatus for measuring the $SO_2$ content of a monitored gas environment, comprising:

a tubular housing means adapted for positioning within a monitored gas environment having an open end and a means associated with said open end to enable said monitored gas to enter said tubular housing;

a first solid electrolyte electrochemical cell being positioned within said housing, said first electrochemical cell developing an electrical signal indicative of the combination of the $SO_2$ and the $O_2$ content of said monitored gas environment, said first solid electrolyte electrochemical cell including a sensing electrode exposed to said monitored gas environment and a reference electrode isolated from said monitored gas environment, an $SO_2$ reference environment being maintained in contact with said reference electrode;

a second solid electrolyte electrochemical cell being positioned within said tubular housing for developing an electrical signal indicative of the oxygen content of the monitored gas environment, said second solid electrolyte electrochemical cell including a sensing electrode exposed to said monitored gas environment and a reference electrode isolated from said monitored gas environment, an oxygen reference environment being maintained in contact with the reference electrode of said second solid electrolyte electrochemical cell;

monitoring means for measuring electrical signal of said second solid electrolyte electrochemical cell to provide an indication of variations in the oxygen content of said monitored gas environment; and

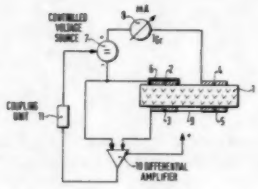
a reference gas supply means including a source of oxygen and a source of an inert gas, means for mixing the inert gas and the oxygen gas and means for adjustably supplying said gas mixture to the reference electrode of said first solid electrolyte electrochemical cell to compensate for changes in the oxygen content of the monitored gas environment such that the electrical signal developed by said first solid electrolyte electrochemical cell is a measurement of the $SO_2$ content of the monitored gas environment.

## 4,391,691

## TEMPERATURE COMPENSATED POLAROGRAPHIC OXYGEN GAS SENSOR AND SENSING SYSTEM, PARTICULARLY FOR AUTOMOTIVE APPLICATION

Ernst Linder, Muhlacher; Helmut Maurer, Horrheim; Klaus Muller, Tamm, and Franz Rieger, Aalen-Wasseralfingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 11, 1981, Ser. No. 242,579
Claims priority, application Fed. Rep. of Germany, Mar. 20, 1980, 3010632
Int. Cl.[3] G01N 27/56, 27/58
U.S. Cl. 204—408 15 Claims




1. Temperature and aging compensated polarographic sensing system to determine the oxygen content of gases, especially exhaust gases from an internal combustion engine comprising

a single solid electrolyte body (1);

a first electrode forming an anode electrode (3), applied to a first surface portion of said body, and exposed to the gases;

a second electrode forming a cathode electrode (2) applied to a second surface portion of the body spaced from said first surface portion by a first electrolyte body portion (1*a*);

voltage source means (7) furnishing a voltage, having one terminal (−) connected to one (2) of the electrodes, and second terminal (+) connected to the other one (3) of the electrodes (2, 3);

means (6) forming a diffusion barrier controlling access of oxygen molecules to the cathode electrode (2);

current sensing means (8) measuring the current in an oxygen ion sensing system formed by the voltage source means (7), the anode electrode (3), the solid electrolyte body between the first and the second surface portions of the solid electrolyte body and the cathode electrode (2) and providing an output indication of limit current flow as a function of diffusion of oxygen molecules through said diffusion barrier,

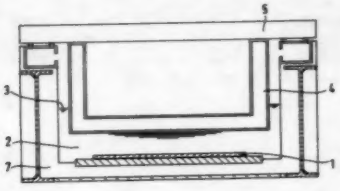
and means for rendering the current independent of aging effects and temperature, comprising

a third electrode (4) positioned on a third surface portion of said solid electrolyte body (1) spaced from said one of said electrodes by a second body portion (1*b*) and being serially connected between the other terminal (+) of the voltage source and said other one (3) of the electrodes (2, 3), said further electrode (4) and said second body portion (1*b*) of said solid electrolyte body (1) forming an oxygen ion conductive ohmic resistance which is serially connected between the cathode and anode electrodes (2, 3).

## 4,391,692
## DEVICE FOR THE CHEMICAL OR ELECTROCHEMICAL SURFACE TREATMENT OR MATERIAL IN A HEATED LIQUID TREATMENT MEDIUM, MORE PARTICULARLY A STRIP PICKLING PLANT

**Walter Mindt, Bendorf, Fed. Rep. of Germany, assignor to Mannesmann Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany**

**Filed Jan. 7, 1981, Ser. No. 222,987**
**Claims priority, application Fed. Rep. of Germany, Jan. 8, 1980, 3000408**
**Int. Cl.³ C25D** *7/06, 17/02*
**U.S. Cl. 204—206** **7 Claims**



1. A device for heated liquid treatment of the surface of an object placed therein, comprising:

a tank having an open top portion, said tank capable of receiving an object to be treated and a liquid for such treatment;

a movable lid overlying the opening in said tank;

at least one movable evaporation minimizing cover placed within said tank and attached to said lid, said at least one evaporation minimizing cover being so configured as to be partially immersed in and cover a substantial portion of the surface of a liquid placed in said tank and to displace the liquid so as to reduce free space existing between the surface of the liquid and the underside of said movable lid.

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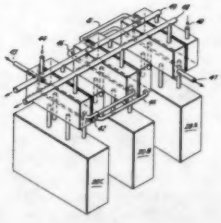
## 4,391,693
## CHLORINE CELL DESIGN FOR ELECTROLYTE SERIES FLOW

**John R. Pimlott, Sweeny, Tex., assignor to The Dow Chemical Company, Midland, Mich.**

**Filed Oct. 29, 1981, Ser. No. 316,265**
**Int. Cl.³ C25B** *9/00, 15/00*
**U.S. Cl. 204—237** **12 Claims**



1. In a bank or series of chlor-alkali electrolytic cells, wherein each cell comprises at least one electrode pair separated by a cation permselective, substantially hydraulically impermeable membrane, with means for flowing catholyte from cell-to-cell sequentially,

the embodiment in which the means for flowing catholyte from cell-to-cell comprises, in operable combination,

entry means for adding water or dilute caustic to the catholyte portion of a first cell of the bank or series,

flow means for directing gas-lifted catholyte liquor from said first cell to a de-gassing compartment above said cathodes,

flow means for directing at least a portion of the de-gassed catholyte to a point below the surface of the catholyte liquor in the next successive cell while allowing at least a portion of the de-gassed catholyte to re-enter the cell from which it came,

flow means for directing gas-lifted catholyte liquor from said next successive cell and each additional successive cell in the series thereafter, to a degassing compartment above the cathodes, at least a portion of the de-gassed catholyte of each cell being directed to a next successive cell while allowing at least a portion of the de-gassed catholyte to re-enter the cell from which it came,

flow means for directing de-gassed catholyte liquor from the last cell of the bank or series, and

flows means for removing cell gasses from the de-gassing compartment.

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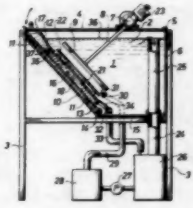
## 4,391,694
## APPARATUS IN ELECTRO DEPOSITION PLANTS, PARTICULARLY FOR USE IN MAKING MASTER PHONOGRAPH RECORDS

**Bengt W. Runsten, Stockholm, Sweden, assignor to AB Europa Film, Bromma, Sweden**

**Filed Feb. 11, 1982, Ser. No. 347,864**
**Claims priority, application Sweden, Feb. 16, 1981, 8101046**
**Int. Cl.³ C25D** *21/12, 1/10*
**U.S. Cl. 204—273** **13 Claims**



1. Apparatus including: a tub (1) intended for plating electrolyte and having an overflow pipe (25) having an open end within the tub (1) for discharging electrolyte that exceeds a predetermined level (36), at least one receptacle (12) for anode material participating in the electro deposition process, and

means (24–30) for circulating and maintaining the level of the electrolyte in the tub, the receptacle (12) having one or more openings (18) situated under the liquid level (36) in the tub, characterized in the receptacle communicates with an outlet (35) arranged at a level between said opening (18) and the liquid level (36) in the tub (1), said outlet being in communication with return piping (32,33) for the electrolyte (2), whereby the liquid level (37) in the receptacle will be below that (36) prevailing in the bath (1), so that the liquid (2) circulating in the tub (1) partially departs through said opening (18), subsequently to flow through the anode material (16) and to the outlet (35) in said receptacle.

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## 4,391,695
## COATED METAL ANODE OR THE ELECTROLYTIC RECOVERY OF METALS

**Konrad Koziol, Röthenbach, and Erich Wenk, Nuremberg, both of Fed. Rep. of Germany, assignors to Conradty GmbH Metallelektroden KG, Röthenbach, Fed. Rep. of Germany**

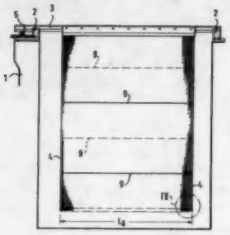
**Filed Feb. 3, 1981, Ser. No. 231,165**
**Int. Cl.³ C25B** *11/02*
**U.S. Cl. 204—286** **15 Claims**

1. A coated metal anode for the electrolytic recovery of

metals, the working surface of which is represented by rods which are arranged in a plane in spaced, parallel relationship to each other, and which are electrically connected to a current supply rail, wherein:

said rods lie in a plane with the current supply rail, so as to create a substantially planar rectangular, surface of the anode;

said rods being arranged in such a manner that a larger portion of the area of said rods extends perpendicular to the arrangement plane assumed by said rods than is congruent with said plane; and



said rods are connected to said current supply rail at one end face; and

both the electrical and mechanical connection of each rod with said current supply rail takes place by means of at least one connecting strip extending parallel to said rod; and wherein

one marginal region of said connecting strip is connected with said current supply rail and another marginal region is connected with said rods.

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**4,391,696**

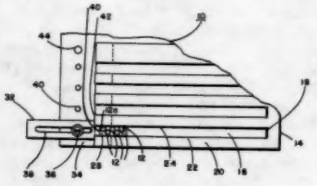
**METHOD AND APPARATUS FOR HOLDING STYLI**

**James J. Cowden, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.**

**Filed Aug. 25, 1981, Ser. No. 296,225**

**Int. Cl.³ C25D** *7/00, 17/10*

**U.S. Cl. 204—297 W** **9 Claims**



1. An apparatus for holding a plurality of styli in a high-density configuration during processing comprising:

a holder having a slot with a closed end disposed adjacent a first surface thereof, said slot having a pair of longitudinal sides parallel to each other and separated by a distance greater than the diameter of a stylus but less than twice the stylus diameter, said holder having a stack of said styli juxtaposed in two rows oriented along said slot toward said closed end, and

means attached to said holder at the end of said slot, opposite the closed end, for exerting a clamping force against the stylus disposed at the end of said stack of styli, said exerting means adapted to push said styli toward the closed end of said slot and thereby effectively hold said styli within said slot.

**4,391,697**

**HIGH RATE MAGNETRON SPUTTERING OF HIGH PERMEABILITY MATERIALS**

**Charles F. Morrison, Jr., Boulder, Colo., assignor to Vac-Tec Systems, Inc., Boulder, Colo.**

**Filed Aug. 16, 1982, Ser. No. 408,233**

**Int. Cl.³ C23C** *15/00*

**U.S. Cl. 204—298** **19 Claims**

1. Sputtering apparatus comprising

a target of material to be sputtered, said target including at least first and second elements spaced from one another by a gap;

an anode;

means for generating an electric field between the anode and target;

plasma generating means for generating a plasma within said gap; and

means for generating a trapping magnetic field to confine at least some of said plasma adjacent the target.

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**4,391,698**

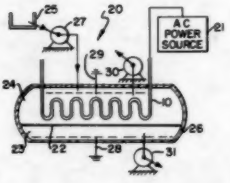
**COALESCER APPARATUS FOR ELECTROSTATICALLY RESOLVING EMULSIONS**

**John P. Wagner, Martinsville, N.J., assignor to Exxon Research and Engineering Co., Florham Park, N.J.**

**Filed Apr. 20, 1981, Ser. No. 255,872**

**Int. Cl.³ B03C** *5/02;* **C10G** *33/02*

**U.S. Cl. 204—302** **5 Claims**




1. A coalescer apparatus for resolving a solids-water-oil emulsion into its phases comprising,

a reaction vessel;

means to introduce a solids-water-oil emulsion into said reaction vessel to provide a water-oil interface in said vessel;

a current carrying electrode below said means for introducing said emulsion and disposed so that under conditions of use said current-carrying electrode is adjacent said interface of the phases of said emulsion, said current-carrying electrode having an inner support member for supporting an outer flexible plastic tube, said outer flexible plastic tube surrounding said inner support member and being concentrically spaced therefrom so as to provide a space therebetween, and an electrolyte disposed within said space between said support member and said plastic tube;

a grounding electrode disposed so that under conditions of use said grounding electrode is in the water phase within said reaction vessel;

means to remove resolved phases of said emulsion from said reaction vessel including a solids pump-off tube disposed so that under conditions of use said solids pump-off tube is between said current-carrying electrode and said interface.

4,391,699

## COAL LIQUEFACTION PROCESS

Joel W. Rosenthal, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 754,198, Dec. 27, 1976, Pat. No. 4,330,389. This application Feb. 3, 1982, Ser. No. 345,281
The portion of the term of this patent subsequent to May 18, 1999, has been disclaimed.
Int. Cl.³ C10G 1/00, 1/06
U.S. Cl. 208—8 LE 28 Claims

1. A process for liquefying coal comprising:
(a) mixing subdivided coal with a solvent to form a coal-solvent slurry;
(b) heating said slurry in a dissolving zone to a temperature in the range of 750°–900° F. at a pressure above 500 psig in the presence of added hydrogen to form a first effluent comprising normally liquid components, non-distillable oil components, and undissolved solids;
(c) passing at least a portion of said first effluent into a reaction zone, said portion comprising non-distillable oil components, and contacting said portion with hydrogen in the presence of an externally provided hydrogenation catalyst under hydrogenation conditions, including a temperature below 800° F. and lower than the temperature in said dissolving zone;
(d) withdrawing a second effluent from said reaction zone, said second effluent comprising normally liquid components and non-distillable oil components; and
(e) recycling at least a portion of said second effluent to step (a), said recycle portion comprising both normally liquid components and non-distillable oil components.

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4,391,700

## PROCESS FOR CONVERTING HEAVY HYDROCARBON OILS, CONTAINING ASPHALTENES, TO LIGHTER FRACTIONS

Alain Billon, Orlienas; Jean-Francois Le Page, Rueil Malmaison; Jean-Pierre Peries, Mornant, and Jean-Claude Simandoux, Ste. Foy Les Lyon, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Apr. 21, 1981, Ser. No. 256,272
Claims priority, application France, Apr. 21, 1980, 80 08959; Apr. 21, 1980, 80 08960
Int. Cl.³ C10G 47/22, 21/14, 45/08
U.S. Cl. 208—86 16 Claims

1. A process for converting an asphaltenic oil to lighter fractions, which comprises the steps of:
(a) deasphalting the asphaltenic oil with an aliphatic $C_{5-7}$ hydrocarbon solvent, said deasphalting being effected under conditions such that the major part of the resins remains in the deasphalted oil, and recovering the resultant deasphalted oil;
(b) maintaining the deasphalted oil with hydrogen at 440°–530° C. for 1 second to 10 hours, under a pressure of 40 to 140 bars, in a non-catalytic conversion zone;
(c) feeding the product of step (b) with hydrogen into a catalytic conversion zone at 320°–430° C., under a pressure of 40 to 140 bars, in contact with at least one catalyst comprising at least one molybdenum compound or tungsten compound or a mixture thereof and at least one nickel compound or cobalt compound or a mixture thereof, and recovering the resultant hydrocarbon fractions.

4,391,701

## PROCESS FOR UPGRADING HEAVY OILS

Jean-Francois Le Page, Rueil Malmaison, and Germain Martino, Poissy, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

Filed Apr. 9, 1981, Ser. No. 252,675
Claims priority, application France, Apr. 9, 1980, 80 07956
Int. Cl.³ C10L 1/02; F17D 1/17
U.S. Cl. 208—370 13 Claims

1. A process for reducing the viscosity of a heavy oil, comprising the steps of:
(a) deasphalting at least a portion of the heavy oil, and separately recovering a deasphalted heavy oil and asphaltenes;
(b) gasifying at least a portion of said asphaltenes to produce a synthesis gas;
(c) converting at least a portion of said synthesis gas to a mixture of alcohols consisting of methanol and at least one $C_{2-10}$ alcohol; and
(d) admixing said alcohol mixture with the nondeasphalted heavy oil portion or with the deasphalted heavy oil or with a mixture thereof, to produce an oil of lower viscosity.

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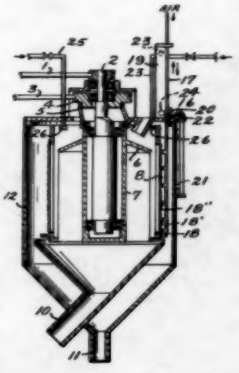
4,391,702

## METHOD FOR CLASSIFICATION OF COALS FOR COKE PRODUCTION

Shozo Murakami; Hiroaki Yamanaka; Kazuhiro Yokoyama; Yasuhiro Yone, all of Himeji, and Tokuji Yamaguchi, Kitakyushu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 73,320, Sep. 7, 1979, Pat. No. 4,310,412. This application Oct. 7, 1981, Ser. No. 309,406
Claims priority, application Japan, Sep. 17, 1981, 56-146735
Int. Cl.³ B07B 1/26
U.S. Cl. 209—10 2 Claims

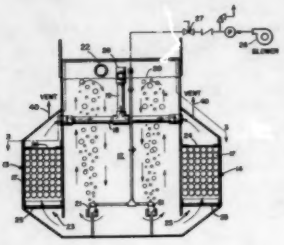



1. A method for classifying wet coal for coke production comprising:
supplying the wet coal into a cylindrical screen arranged in a casing, rotating and revolving the screen in an almost vertical position to subject the wet coal to gravity, centrifugal force and vibrating force, blowing a high pressure gas stream against the outer side of the screen, and vertically moving the blowing position of the gas stream to clean the screen, while classification is being performed so as to obtain the under-mesh and over-mesh coal fractions, and removing adhesions on the inner surface of the casing by the force of water supplied to the rotating screen and thrown thereby from the outside of the screen after the supply of wet coal is stopped.

## 4,391,703
## MARINE SEWAGE TREATMENT WITH BIOLOGICAL FILTER

**Gary A. Crosby, New Iberia, La., assignor to Red Fox Industries, Inc., New Iberia, La.**

**Continuation of Ser. No. 175,400, Aug. 5, 1980, abandoned. This application Apr. 6, 1982, Ser. No. 365,889**
**Int. Cl.³ C02F 3/10**
**U.S. Cl. 210—151** **5 Claims**



1. A marine sewage disposal system for use on board a vessel comprising:

(a) a central aeration chamber having air diffusers supplied with air from a blower and being positioned to supply air from the bottom of said chamber upwardly toward the top, said chamber adapted to receive sludge to a top level therein;

(b) a pair of biological filters, one positioned to each side of said aeration chamber and contiguous therewith, to receive aerated sludge therefrom, said biological filters having a plurality of buoyant plastic hollow spheres retained in filter tiers on foraminous grating so that as the liquid flows up through the spherical filter tiers some of the sludge and entrapped sewage waste solids will separate from the liquid by gravity settling and dissolved oxygen is supplied to bacteria on said biological filters by liquid convection and oxyen diffusion,

(c) a crossover pipe connecting said filters and being positioned below the top level of sludge in said aeration chamber; and

(d) a chlorine contact tank connected to receive clarified liquid from said crossover pipe by a flexible exit pipe to transfer clarified liquid from the biological filters to the chlorine tank for treatment with chlorine from a source of chlorine, prior to discharge.

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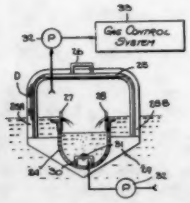
## 4,391,704
## GAS-EXTRACTION ARRANGEMENT FOR WASTEWATER SETTLING TANK

**Arthur Anderson, Cypress, Calif., assignor to Fischer & Porter Company, Warminster, Pa.**

**Filed Jul. 28, 1981, Ser. No. 287,791**
**Int. Cl.³ B01D 19/00; C02F 1/20**
**U.S. Cl. 210—188** **16 Claims**




1. In combination with a settling tank for a wastewater treatment, said tank including an inlet line for feeding wastewater therein, means to remove sludge from the tank and an outlet zone defined by an effluent trough, at least one side of which has a weir to permit clarified water to spill into the trough; and an outlet to remove clarified water from said trough; an arrangement for preventing noxious gases generated in the wastewater from being discharged into and fouling the atmosphere, said arrangement comprising:

A. a hood which is supported over the trough to define a confined region to capture said gases, said hood having a side wall which protrudes into the water in said settling tank at a position spaced from the weir side of the trough, said side wall protruding into the water to a depth below the upper edge of the weir to form a scum baffle integral with the hood; and

B. means to treat the captured gases to render them inactive, and to prevent the discharge of said noxious gases into the atmosphere.

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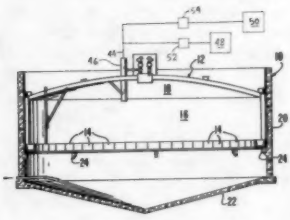
## 4,391,705
## BALLASTING DIGESTOR COVERS

**Lynn W. Cook, Fruit Heights, and David P. Brown, Salt Lake City, both of Utah, assignors to Envirotech Corporation, Salt Lake City, Utah**

**Filed May 29, 1981, Ser. No. 268,214**
**Int. Cl.³ C02F 11/04**
**U.S. Cl. 210—218** **3 Claims**



1. An apparatus for digesting sludge comprising: a cylindrical tank, a cover adapted to move upwardly and downwardly within the tank, with the cover having an upright cylindrical sidewall the lower end thereof adapted to project into the sludge to form a gas-tight seal therewith and with gas being stored under the cover above the surface level of the sludge, a gas outlet at the upper end of the cover, valve means communicating with said outlet for regulating flow of gas from under the cover, a plurality of separate ballast members mounted to the interior of said sidewall near the lower end thereof, at least some of the ballast members each having a cavity formed in the upper end thereof that extends downwardly into the ballast member so that the cavity will fill with sludge upon flow of sludge into the tank and that is adapted to hold a predetermined substantial quantity of sludge therein, whereby when the volume of gas accumulated under the cover is sufficient to lift said ballast members partially from the sludge the predetermined total quantity of sludge within the ballast members effectively increases the total ballasting weight of the ballast members by a substantial predetermined amount over the ballasting weight of the members when they are not filled with sludge.

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## 4,391,706
## FILTER ELEMENT SEALING DEVICE FOR FILTER PAN

**Richard W. Steinkraus, 5111 Willowbrook La., Lakeland, Fla. 33803**

**Filed Jan. 20, 1982, Ser. No. 341,074**
**Int. Cl.³ B01D 33/24, 33/34**
**U.S. Cl. 210—232** **11 Claims**

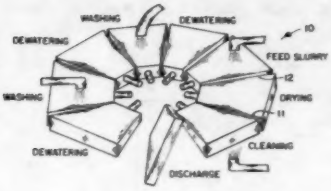
10. A filter pan filter sealing device for sealing the peripheral

edge of a filter element adjacent the sidewall of a filter pan comprising:

a peripheral sidewall of the filter pan;

a contour having a plurality of surfaces disposed on said peripheral sidewall of the filter pan;

a sealing strip having a portion thereof for cooperatively mating with said contour of said peripheral sidewall;




a longitudinally extending member disposed adjacent one portion of said sealing strip with the peripheral edge of the filter element disposed adjacent to a second portion of said sealing strip; and

means for urging said longitudinally extending member toward said peripheral sidewall enabling said sealing strip to seal the peripheral edge of the filter element between said sealing strip and said peripheral sidewall of the filter pan.

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**4,391,707**

## FLOATING, SURFACE LIQUIDS RETRIEVAL SYSTEM

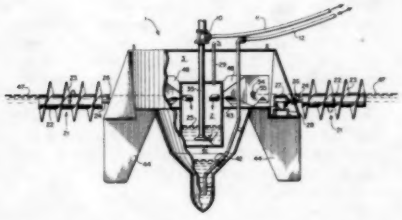
**Ellison T. Gordon, Covington, La., assignor to Zolico International, Inc., Covington, La.**

**Continuation-in-part of Ser. No. 905,383, May 12, 1978, Pat. No. 4,196,087. This application Mar. 31, 1980, Ser. No. 135,642**

**The portion of the term of this patent subsequent to Apr. 1, 1997, has been disclaimed.**

**Int. Cl.³ E02B *15/04***

**U.S. Cl. 210—242.3** **10 Claims**



1. A buoyant apparatus for collecting liquids floating on the surface of water, comprising:

a. a basic body having an internal liquid collecting chamber having flotation means associated therewith for providing flotation to said body;

b. at least three intake port located adjacent to and in communication with said collecting chamber arranged to allow for the passage of the liquid from the exterior to said collecting chamber said intake ports being positioned and spaced at least generally equally about the periphery of said basic body;

c. at least three floating screw means connected to said basic body and extending radially out there from a number of feet for pulling the surface liquids to said intake port inwardly from a distance many feet away from said basic body, said floating screw means being likewise positioned and spaced at least generally equally about the periphery of said basic body, each said floating screw means having independently operable drive means for independently and controllably rotating said screw means to propel and guide the direction of travel of said basic body across the water surface;

d. gravity separator means integrally combined with said collecting chamber for further separating the floating liquids and the water; and

e. liquid pick-up means in said collecting chamber including pumping means for pumping up the liquids for pick-up and ultimate removal of the liquids from the water.

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**4,391,708**

## APPARATUS FOR THE SELECTIVE SKIMMING OF A LIGHT LIQUID LAYER ON A BODY OF WATER

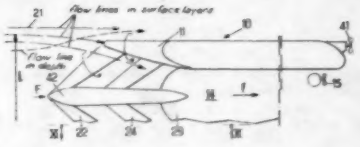
**Jean Le Foll, 14, avenue de l'Europe, 78160 Marly Le Roi, and Henry Benaroya, 41, Boulevard du Commandant Charcot, 92200 Neuilly Sur Seine, both of France**

**Continuation-in-part of Ser. No. 198,972, Jun. 3, 1980, abandoned. This application Feb. 23, 1982, Ser. No. 351,633**

**Claims priority, application France, Oct. 3, 1978, 78 28254**

**Int. Cl.³ E02B *15/04***

**U.S. Cl. 210—242.3** **9 Claims**




1. Apparatus for removing floating liquid pollutants from a body of water, comprising: a hull provided with means for moving it in a predetermined direction through the body of water and having two lateral parts, and a vertical central part, placed between the lateral parts, projecting forwards with respect to the latter in said predetermined direction and bearing immersed deflector wings part at least of which is located forward of the lateral parts, said wings being shaped for creating vortices in the water body, the orientation of said vortices tending to diminish the divergence of the flow lines in the vicinity of free water level ahead of said lateral parts due to movement of the apparatus, said lateral parts and central part cooperating to define ducts directing a flow of water and pollutant taken close to the water level to separator means in said hull.

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**4,391,709**

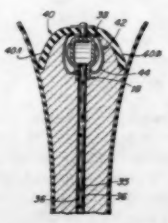
## FILTER CAKE CONTROL METHOD AND APPARATUS

**Henry Schmidt, Jr., Hinsdale, Ill., assignor to Industrial Filter & Pump Mfg. Co., Cicero, Ill.**

**Continuation of Ser. No. 113,618, Jan. 21, 1980, abandoned. This application Apr. 27, 1981, Ser. No. 257,895**

**Int. Cl.³ B01D *29/12***

**U.S. Cl. 210—332** **10 Claims**




10. In a pressure filter, the combination comprising a filter leaf including a support structure having first and

second mutually parallel, planar, vertically disposed perforate surfaces on opposite sides of a cavity in said leaf,

elastomeric cake control means positioned across the top of said perforate surfaces and extending laterally therefrom,

a pair of cake compression diaphragm means respectively disposed in spaced, coplanar relationship with said perforate surfaces and in spaced relationship with said cake control means and movable toward said surfaces against filter cakes deposited on said surfaces during the operation of said filter, and

said diaphragm means sealably engaging said cake control means while moving toward said perforate surfaces and compressing said filter cakes against said perforate surfaces.

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**4,391,710**

## CYTOCENTRIFUGE

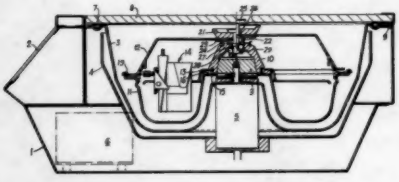
**Alan J. Gordon, Liverpool, England, assignor to Shandon Southern Products Limited, Runcorn, England**

**Filed Aug. 3, 1981, Ser. No. 289,374**

**Claims priority, application United Kingdom, Sep. 15, 1980, 8029732**

**Int. Cl.³ B01D *33/22***

**U.S. Cl. 210—361** **13 Claims**



3. A cytocentrifuge comprising

(a) a rotating carrier; and

(b) a plurality of assemblies mounted on the carrier for rotation therewith and for removal therefrom as a unit, each assembly including

(1) a holder comprising a channel member having a web and a flange, the channel member retaining a slide providing a receiving surface and a filter card overlying the slide and providing an absorbent seal thereover,

(2) a sample chamber comprising a tube having an end flange shaped to be received by the holder in overlying relationship to the slide and filter card; and

(3) said holder further comprising clamping means adapted to engage the end flange of the sample chamber for urging the same towards the web of the channel member whereby the assembly of sample chamber, filter card and slide is secured, the clamping means comprising

(4) a rocking element pivoted to the channel member, the channel member having two of said flanges and the rocking element having lugs extending over the flanges of the channel member to engage the end flange of the sample chamber, the rocking member being spring-loaded for rocking in a direction causing the lugs to move towards the web of the channel member whereby a clamping force is produced on the end flange of the sample chamber.

**4,391,711**

## METHOD OF, AND APPARATUS FOR, EFFECTING LIQUID-LIQUID CONTACT

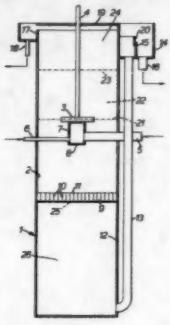
**Ian D. Jackson; Derek Berry; George A. Rowden, all of Stockton-on-Tees, and Malcolm Dilley, Middlesbrough, all of England, assignors to Davy McKee (Minerals & Metals) Limited, Stockton-on-Tees, England**

**Filed Mar. 19, 1981, Ser. No. 245,591**

**Claims priority, application United Kingdom, Mar. 19, 1980, 8009180**

**Int. Cl.³ B01D *11/04***

**U.S. Cl. 210—634** **13 Claims**



1. A method of effecting liquid-liquid contact between an aqueous liquid medium and an organic hydrophobic liquid medium capable of undergoing mass transfer with the aqueous medium, comprising:

providing a chamber containing a body of each of the aqueous and organic liquid media;

agitating the liquid media within a mixing zone in the chamber so as to form a dispersion band which contains a dispersion of droplets of one of the media dispersed within the other, the droplets of dispersed medium being of a size such that upon standing under gravity the dispersion will substantially completely disengage into two separate liquid layers, the volume ratio of the media in the dispersion band corresponding substantially to a selected value, and the mixing zone being disposed within the chamber with a free space that is devoid of baffles above and/or below the mixing zone so that there are formed above and below the dispersion band respectively an upper layer of lighter medium and a lower layer of heavier medium, at least one of which layers extends at least partially into the corresponding free space and so that dispersion can freely re-enter the mixing zone;

supplying at least one of the aqueous and organic liquid media to the mixing zone at a respective preselected feed rate;

allowing dispersion freely to re-enter the mixing zone;

allowing disengaged lighter and heavier media to pass from the dispersion band to the upper and lower layers respectively; and

recovering disengaged lighter and/or heavier medium from the upper and/or lower layer respectively at a rate in each case substantially equal to the rate of supply of that medium to the mixing zone, thereby to maintain the volume ratio of the media in the dispersion band substantially at the selected value.

7. Apparatus for effecting liquid-liquid contact between an aqueous liquid medium and an organic hydrophobic liquid medium capable of undergoing mass transfer with the aqueous medium, comprising:

a chamber for holding a body of each of the aqueous and organic liquid media;

agitator means within the chamber for agitating the liquid media in a mixing zone so as to form a dispersion band

which contains a dispersion of droplets of one of the media dispersed within the other, the droplets of dispersed medium being of a size such that upon standing under gravity the dispersion will substantially completely disengage into two separate liquid layers, the mixing zone being disposed within the chamber with a free space above and/or below it that is devoid of baffles such that an upper layer of disengaged lighter medium may form above the dispersion band whilst a layer of disengaged lower medium may form below the dispersion band with at least one of these layers extending at least partially into the corresponding free space and such that dispersion can freely re-enter the mixing zone;

means for supplying at least one of the aqueous and organic liquid media to the mixing zone; and

means for recovering from the chamber lighter and/or heavier medium from the upper and/or lower layer respectively at a rate in each case substantially equal to the rate of supply of that medium to the mixing zone.

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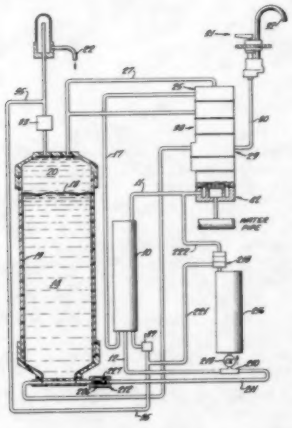
## 4,391,712
## REVERSE-OSMOSIS WATER PURIFIER APPARATUS AND METHOD

**Truman V. Tyler, and Robert B. Sprague, both of Long Beach, Calif., assignors to Richard W. Beall, Jr., Manhattan Beach; Louis J. Favara, Thousand Oaks; Richard L. Gausewitz, Orange; Richard F. Carr, Orange; Allan Rothenberg, Orange and Elgin Edwards, Orange, all of, Calif.**

**Filed Jul. 21, 1981, Ser. No. 285,456**

**Int. Cl.³ B01D** *31/00, 13/00*

**U.S. Cl. 210—652** **7 Claims**



7. A method of maintaining the purity of the water in the pure-water storage means of a reverse-osmosis water purification system of the type which shuts down automatically when said pure-water storage means has been filled to its capacity by water emanating from the pure-water outlet of a reverse-osmosis filter unit, and which starts operating automatically when water is thereafter drawn out of said pure-water storage means, said method comprising:

(a) diverting to an accumulator a predetermined quantity of water which emanates from the pure-water outlet of the reverse-osmosis filter unit following a period of shutdown, said predetermined quantity being at least about equal to the pure-water capacity of said filter unit,

said diverting commencing when water is drawn out of said pure-water storage means,

(b) ceasing said diverting when said accumulator has received said predetermined quantity, so that water then flows from said pure-water outlet to said pure-water storage means, and

(c) dumping said accumulator when said pure-water storage means has filled to its capacity,

said diverting, said ceasing of said diverting, and said dumping being effected automatically, in the absence of any manual operation.

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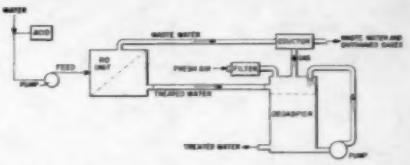
## 4,391,713
## REVERSE OSMOSIS UNIT-DEGASIFIER SYSTEM

**Verity C. Smith, Dedham, Mass., assignor to Vaponics Inc., Plymouth, Mass.**

**Continuation of Ser. No. 161,339, Jun. 20, 1980, abandoned. This application Oct. 15, 1981, Ser. No. 311,883**

**Int. Cl.³ B01D** *31/00, 13/00*

**U.S. Cl. 210—652** **2 Claims**



2. A method of degasifying water passed through the reverse osmosis membrane of an RO unit, comprising the steps of:

providing a degasifier having an inlet for receiving water to be degasified and a low pressure chamber for removing gas from said degasifier;

conveying the output of said RO unit to said degasifier;

providing an educator for producing low pressure in response to a flow of liquid under high pressure;

conveying the waste water under high pressure from said RO unit to said educator to produce low pressure in said educator in response to the flow of waste water as said degasifier is receiving said water passed through the RO unit; and

connecting said educator to said degasifier low pressure chamber.

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## 4,391,714
## PROCESS FOR REMOVING MOLYBDENUM FROM AQUEOUS SALT SOLUTIONS

**Eberhard Preisler, Erftstadt; Bernhard Hofmann, Hürth-Knapsack, and Johannes Holzem, Hüth-Gleuel, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Apr. 6, 1982, Ser. No. 365,989**

**Claims priority, application Fed. Rep. of Germany, Apr. 10, 1981, 3114559**

**Int. Cl.³ C25G** *1/00*

**U.S. Cl. 210—670** **10 Claims**

1. In the process for removing molybdenum from aqueous salt solutions by adsorbing it on manganese dioxide, the improvement which comprises contacting the salt solution with a bed of manganese dioxide ($MnO_2$) precipitated electrolytically and transformed into granular material.

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## 4,391,715
## WASTE TREATMENT PROCESS

**Colin F. Coates, Northumberland, England, assignor to Sterling Drug Inc., New York, N.Y.**

**Filed Aug. 13, 1981, Ser. No. 292,404**

**Int. Cl.³ C02F** *1/72*

**U.S. Cl. 210—696** **9 Claims**

1. A process for preventing tar or foam formation in an aqueous waste containing diazonium salts, thereby rendering said waste liquor suitable for disposal or further treatment, which comprises treating said waste liquor with sulfite ions in

amount sufficient to decompose substantially all of the diazonium salts in said waste liquor.

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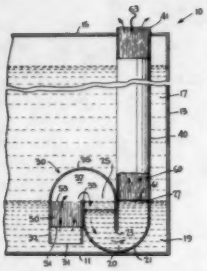
**4,391,716**
**PREFERENTIAL WICKING SYSTEM**

**H. Michael McCurry, Richmond, Va., assignor to American Filtrona Corporation, Richmond, Va.**

**Filed Dec. 22, 1981, Ser. No. 333,300**
**Int. Cl.³ B01D *17/02***
**U.S. Cl. 210—799** **24 Claims**



**1**. Apparatus for use in an upright position in separating a first liquid having a first specific gravity from a second liquid having a second specific gravity less than said first specific gravity, said apparatus comprising:

a liquid trap chamber having a liquid-containing portion including a bottom chamber wall, an upwardly-directed inlet opening disposed above said liquid-containing portion, an upwardly-directed outlet opening disposed above said liquid-containing portion, and a top wall with a lowermost section separating said inlet and outlet openings;

an inlet passage having a liquid ingress opening disposed at a level above said bottom wall and below said lowermost section of said top wall, said inlet passage further including weir means disposed at a level above said top and positioned to spill liquid above a predetermined level in said inlet passage into the inlet opening of said chamber;

an outlet passage extending generally upward from said outlet opening of said chamber;

primer wick means, having top and bottom ends disposed to transversely fill a portion of said inlet passage, for drawing liquid upward through said inlet passage from said ingress opening, wherein the bottom end of said primer wick means is disposed at a level spaced above said ingress opening; and

exhaust means disposed at a further level in said outlet passage for drawing liquid at or above said further level upward through said outlet passage, wherein said further level at least as high as the top end of said primer wick.

**23**. A method for separating a first liquid of known specific gravity from a second liquid of lesser specific gravity in a tank wherein the second liquid is supported by surface tension in a column above said first liquid, said method comprising the steps of:

drawing liquid from the bottom of said tank upward through an inlet passage with a primer wick;

flowing liquid from said inlet passage over a weir and into a liquid trap chamber;

drawing liquid above a predetermined height in said liquid trap chamber out of said tank; and

establishing a liquid dam of said first liquid in said liquid trap chamber to block flow communication between said inlet passage and said predetermined height when the level of said first liquid in said tank falls to a predetermined level.

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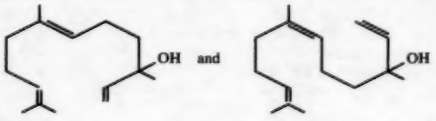
**4,391,717**
**USE OF ISOMERIC FARNESENE PRODUCT-BY-PROCESS FOR AUGMENTING OR ENHANCING THE AROMA OF PERFUME COMPOSITIONS, COLOGNES AND PERFUMED ARTICLES**

**Braja D. Mookherjee, Holmdel; Robert W. Trenkle, Bricktown, both of N.J.; Bernard J. Chant, Rye, N.Y.; Anton V. Ouwerkerk, Livingston, N.J.; Venkatesh Kamath, Red Bank, N.J., and Cynthia J. Mussinan, Bricktown, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.**

**Division of Ser. No. 292,392, Aug. 13, 1981. This application May 6, 1982, Ser. No. 375,534**
**Int. Cl.³ D06M *13/16***
**U.S. Cl. 252—8.6** **3 Claims**

**1**. A process for augmenting or enhancing the aroma of the head space above a dried batch of clothing comprising the step of adding to the clothing batch prior to drying and during the washing cycle a drier-added fabric softener article having previously added thereto an aroma augmenting or enhancing quantity of a farnesene isomer mixture produced according to the process of dehydrating a nerolidol isomer mixture containing nerolidol isomers defined according to the structures:




in the presence of a catalyst selected from the group consisting of potassium acid sulfate and paratoluene sulfonic acid at a temperature in the range of from 110° C. up to 200° C. and at a pressure in the range of from 1 mm/Hg pressure up to 200 atmospheres pressure, absolute.

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**4,391,718**
**SULPHONATED MONO-HYDRIC DIARYL PHENOL FORMALDEHYDE CONDENSATES, THEIR PREPARATION, THEIR USE AS DISPERSING AGENTS AND FORMULATIONS CONTAINING THEM**

**Gunther Reitz, Cologne; Karlhans Jakobs, Bergisch Gladbach, and Günther Boehmke, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

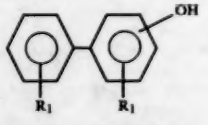
**Filed Aug. 14, 1981, Ser. No. 292,867**
**Claims priority, application Fed. Rep. of Germany, Sep. 4, 1980, 3033329**
**Int. Cl.³ B01F *17/30*; C08G *8/18***
**U.S. Cl. 252—8.7** **1 Claim**

**1**. A dispersing agent comprising

(a) an addition product of an aliphatic, araliphatic or alkylaromatic alcohol, carboxylic acid or carboxylic acid amide with 12 to 22 C atoms and 3–8 mols of ethylene oxide,

(b) an addition product of an aliphatic, araliphatic or alkylaromatic alcohol, carboxylic acid or carboxylic acid amide with 12 to 22 C atoms and 9 or more mols of ethylene oxide, and

(c) a reaction product prepared by sulphonation or sulphomethylation and formaldehyde condensation of a compound of the formula




wherein

$R_1$ represents $C_{1-4}$-alkyl,
and, optionally, subsequent conversion of the resulting sulphonic acid into its salt.

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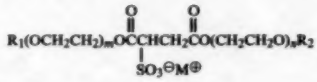
**4,391,719**

## ETHOXYLATED SULFOSUCCINATE ADDITIVES FOR STABILIZING SOLUTIONS OF PETROLEUM SULFONATES IN HARD BRINE

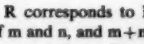
**John J. Meister, Gainesville, Fla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Division of Ser. No. 964,400, Nov. 28, 1978, Pat. No. 4,274,279. This application Dec. 2, 1980, Ser. No. 212,185**
**Int. Cl.³ E21B *43/22***
**U.S. Cl. 252—8.55 D** **6 Claims**

1. An aqueous saline surfactant system suitable for use in tertiary oil recovery operations consisting essentially of brine, a petroleum sulfonate present in an amount in a range of about 0.01 to about 15 weight percent, an ethoxylated sulfosuccinate present in an amount in a range of about 0.01 to about 15 weight percent and a cosurfactant chosen from among the group consisting of $C_3$ to $C_6$ aliphatic alcohols and present in an amount in a range of about 1 to about 7 weight percent with each weight percent based on the weight of water in the surfactant system and wherein the ethoxylated sulfosuccinate derivative is a diester of alpha-sulfosuccinic acid and an ethoxylated alcohol, the diester having the formula



wherein $R_1$ and $R_2$ represent alkyl radicals, which can be different, containing 3–18 carbon atoms and M is selected from the group consisting of sodium, lithium, potassium, ammonium and substituted ammonium; and the ethoxylated alcohol has the formula



wherein R corresponds to $R_1$ or $R_2$, x encompasses all the values of m and n, and m+n is in the general range of from 4 to 100, m or n being at least 1.

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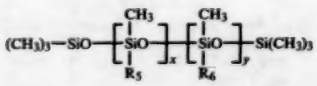
**4,391,720**

## BIS(HYDROXYLKYL)DISILOXANES AND LUBRICANT COMPOSITIONS THEREOF

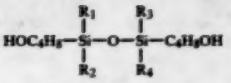
**Chih C. Wang, Hightstown, and Ronald F. Bates, Trenton, both of N.J., assignors to RCA Corporation, New York, N.Y.**

**Division of Ser. No. 231,859, Feb. 5, 1981, Pat. No. 4,355,062. This application Aug. 16, 1982, Ser. No. 408,502**
**Int. Cl.³ C10M *1/50***
**U.S. Cl. 252—49.6** **6 Claims**

1. A composition comprising a solution of a methyl alkyl siloxane lubricant of the formula



wherein $R_5$ and $R_6$ are alkyl groups of 4 to 20 carbon atoms, x is an integer of 2–4, y is an integer of 0–2 and wherein the sum of x and y is 4 or less, containing from about 5 percent to about 70 percent by weight of the lubricant of a compound of the formula



wherein $R_1$ and $R_3$ are methyl or ethyl and $R_2$ and $R_4$ are linear alkyl groups of up to 20 carbon atoms.

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**4,391,721**

## DISPERSANT VISCOSITY INDEX IMPROVER COMPRISING REACTION PRODUCT OF A STYRENE-MALEIC ANHYDRIDE COPOLYMER, AN ALIPHATIC ALCOHOL AND A TERTIARY AMINO ALCOHOL

**Peter G. Pappas, Downers Grove, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.**

**Filed Mar. 25, 1981, Ser. No. 247,600**
**Int. Cl.³ C10M *1/32***
**U.S. Cl. 252—51.5 A** **12 Claims**

1. A dispersant viscosity index improving additive composition, resistant to oxidative thickening and loss of dispersancy, which composition comprises the reaction product of a styrene-maleic anhydride copolymer, an aliphatic alcohol having at least 6 carbon atoms and a tertiary amino alkanol, said composition having been prepared by substantially esterifying said copolymer with said aliphatic alcohol to produce a substantially-esterified copolymer and subsequently transesterifying said substantially-esterified copolymer with said tertiary amino alkanol.

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**4,391,722**

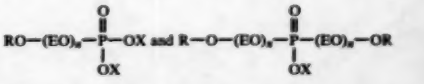
## WATER-BASED LOW FOAM HYDRAULIC FLUID EMPLOYING 2-ETHYLHEXANOL DEFOAMER

**Ellen S. Schwartz, Warren; Clise A. Tincher, Grosse Ile, both of Mich., and Jerrold F. Maxwell, Matteson, Ill., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Filed Apr. 13, 1981, Ser. No. 253,809**
**Int. Cl.³ C09K *3/00*; C10M *3/04***
**U.S. Cl. 252—73** **12 Claims**

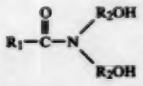
1. A hydraulic fluid concentrate characterized by improved low-foaming properties comprising water, about 0.15 to 2 percent by weight of 2-ethylhexanol, and conventional hydraulic fluid additives wherein said concentrate includes a thickener and at least one additive selected from the group consisting of

phosphate esters or salts thereof selected from the group consisting of



and mixtures thereof wherein ethylene oxide groups are represented by EO; R is selected from the group consisting of linear or branched chain alkyl groups wherein said alkyl groups have about 6 to 30 carbon atoms or alkylaryl groups wherein the alkyl groups have about 6 to 30 carbon atoms and X is selected from the group consisting of hydrogen, alkali or alkaline earth metal, the residue of ammonia or an amine and mixtures thereof, and n is a number from 1 to 50;

an alkyldialkanolamide of the formula



wherein $R_1$ is alkyl of about 4 to about 54 carbon atoms and $R_2$

is alkyl of about 2 to about 6 carbon atoms, or an alkyldialkanolamide prepared by esterifying a dialkanolamine with an alkyl carboxylic acid and removing water of esterification wherein said alkyldialkanolamide is derived from a branched or straight chain, saturated or unsaturated aliphatic dicarboxylic acid having 8 to 54 carbon atoms,

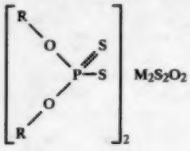
a metal deactivator;

a corrosion inhibitor;

an additional defoamer;

water-soluble ethers or esters of ethoxylated $C_8$–$C_{36}$ aliphatic monohydric or polyhydric alcohols or acids,

sulfur compound additives selected from the group consisting of the ammonia, amine or metal salts of 2-mercaptobenzothiazole or 5-, 6- and 7-substituted 2-mercaptobenzothiazole, and sulfurized molybdenum and antimony compounds represented by the formula:




wherein M is molybdenum or antimony and R is organic and is selected from the group consisting of $C_3$–$C_{20}$ alkyl, aryl, alkylaryl radicals and mixtures thereof, and wherein said thickener is a polyether polyol having a molecular weight of about 1000 to about 40,000 prepared by reacting ethylene oxide or ethylene oxide and at least one lower alkylene oxide having 3 to 4 carbon atoms with at least one active hydrogen-containing compound and at least one alpha-olefin oxide or glycidyl ether having a carbon chain length of about 12 to 18 aliphatic carbon atoms wherein said alpha-olefin oxide or glycidyl ether is present in the amount of 1 to about 20 percent by weight based upon the total weight of said thickener.

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**4,391,723**

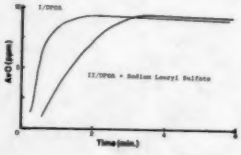
**CONTROLLED RELEASE LAUNDRY BLEACH PRODUCT**

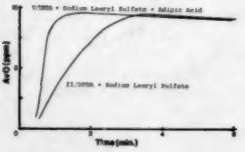
**Dennis R. Bacon, Milford, and Frank P. Bossu, West Chester, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Jul. 13, 1981, Ser. No. 282,562**

**Int. Cl.³ C11D *17/04;* C01B *15/00***

**U.S. Cl. 252—90** **8 Claims**




1. A dry, granular laundry bleach product in a pouch comprising:

I. a peroxyacid bleach selected from the group consisting of hydrotropic acid hydrophilic peroxyacid bleaches,

II. an effective amount of a bleach release-delaying agent; said bleach and agent being contained within a closed water-insoluble but water-permeable pouch of fibrous material; said agent consisting of a surfactant selected from the group consisting of peroxyacid compatible synthetic detergents and short chain fatty acid soaps having carbon chain lengths of from about 8 to 14, whereby said agent delays the release of said peroxyacid bleach from said pouch into laundry wash liquor.

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**4,391,724**

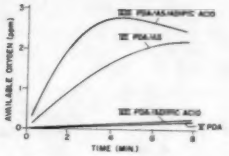
**CONTROLLED RELEASE LAUNDRY BLEACH PRODUCT**

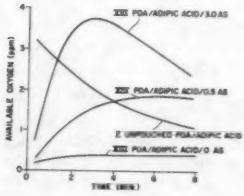
**Dennis R. Bacon, Milford, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Oct. 21, 1981, Ser. No. 313,422**

**Int. Cl.³ C11D *17/04;* C01B *15/00***

**U.S. Cl. 252—90** **10 Claims**




1. A dry, granular laundry bleach product in a pouch comprising:

I. a hydrophobic peroxyacid bleach; and

II. an effective amount of a bleach release agent; said bleach and agent being contained within a closed water-insoluble but water-permeable pouch of fibrous material; said agent consisting of a surfactant selected from the group consisting of peroxyacid compatible synthetic detergents and short chain fatty acid soaps having carbon chain lengths of from about 8 to 14, whereby said agent increases the release of said peroxyacid bleach from said pouch into laundry wash liquor.

3. The invention of claim 1 wherein said peroxyacid is selected from the group consisting of: peroxydecanoic acid, peroxydodecanoic acid, and peroxytetradecanoic acid.

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**4,391,725**

**CONTROLLED RELEASE LAUNDRY BLEACH PRODUCT**

**Frank P. Bossu, West Chester, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Oct. 21, 1981, Ser. No. 313,423**

**Int. Cl.³ C11D *17/04;* C01B *15/00***

**U.S. Cl. 252—90** **11 Claims**

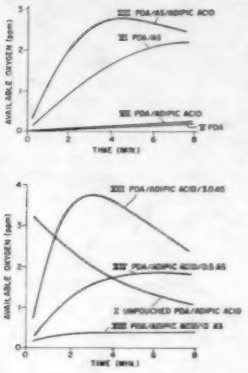
1. A dry, granular laundry bleach-in-a-pouch product comprising:

I. a hydrophobic peroxyacid bleach,

II. a surfactant at level of about 5% to about 60% by weight of the peroxyacid bleach, said surfactant selected from the

group consisting of peroxyacid compatible synthetic detergents and fatty acid soaps, and

III. a water-soluble, peroxyacid compatible acid additive, said acid having a pKa of from about 2 to about 7,




said pouch consisting of a water-insoluble but water-permeable fibrous material; whereby said surfactant increases the level of said bleach released from the pouch into laundry wash liquor; and whereby said acid additive further increases and accelerates the release of said bleach from the pouch into laundry wash liquor in the presence of said surfactant.

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**4,391,726**

**DETERGENT COMPOSITION CONTAINING LOW LEVELS OF AMINE OXIDES**

**Robertus J. C. Koster, Grimbergen, Belgium, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Jun. 16, 1981, Ser. No. 274,126**

**Claims priority, application United Kingdom, Nov. 28, 1980, 8038306**

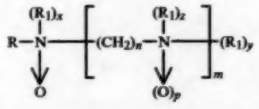
**Int. Cl.³ C11D *7/18***

**U.S. Cl. 252—99** **8 Claims**

1. A particulate laundry detergent composition having enhanced soil release and cleaning properties comprising:

(a) from about 2% to about 25% by weight of a surface-active agent selected from the group consisting of anionic, nonionic, zwitterionic, and ampholytic detergents and mixtures thereof; and

(b) from 0.25–0.75% of an amine oxide having the formula



wherein R is an alkyl or alkenylgroup having 10 to 22 carbon atoms, the $R_1$'s which are identical or different are selected from $C_{1-4}$ alkyl, ethylene oxide and propylene oxide, n is an integer from 1 to about 6, m is an integer from 0 to about 6, p is 0 or 1, x, y, and z are each 1 for alkylsubstituents, and integers in the range from 1 to 10 for ethylene oxide or propylene oxide substituents such that the sum of (x+y+z) is not greater than 25,

(c) from about 3% to about 50% by weight of a peroxybleach compound; and

(d) from about 1% to about 50% by weight of a detergent builder;

whereby a 1% aqueous solution of the composition, measured at 20° C., has a pH in the range from about 8.5 to about 11.

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**4,391,727**

**NON-CAKING BLEACH CONTAINING MOLECULAR SIEVE ZEOLITE**

**Claude L. Benz, Belle-Mead, N.J., assignor to Colgate Palmolive Company, New York, N.Y.**

**Continuation of Ser. No. 185,730, Sep. 11, 1980, abandoned, which is a continuation of Ser. No. 814,033, Jul. 8, 1977, abandoned, which is a continuation of Ser. No. 640,791, Dec. 15, 1975, abandoned. This application Sep. 4, 1981, Ser. No. 299,506**

**Int. Cl.³ C01B *15/12*; C09K *3/00*; C11D *7/20, 7/54***

**U.S. Cl. 252—99** **3 Claims**

1. A non-caking bleaching composition comprising: by weight from 28.5 to 34.9% sodium perborate tetrahydrate; from 8.1 to 9.9% sodium carbonate; from 8.1 to 9.9% sodium silicate having an $Na_2O:SiO_2$ ratio of about 1:2.35; from 0.9 to 1.1% calcined aluminum silicate clay; from 33.9 to 41.3% sodium sulfate; from 8.1% to 9.9% of a crystalline, water-insoluble aluminosilicate molecular sieve 4A zeolite having a particle size of from 5 to 9 microns, and being in about a 2% hydrated form; the composition having a moisture content of about 1.8 to 2.2%.

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**4,391,728**

**PROPYLENE OXIDE ADDUCTS OF TOLUENEDIAMINE**

**Alexander Korczak, Grosse Ile, and William W. Levis, Jr., Wyandotte, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.**

**Filed Dec. 1, 1981, Ser. No. 326,298**

**Int. Cl.³ C08L *71/02***

**U.S. Cl. 252—182** **11 Claims**

1. A polyol composition comprising the reaction product prepared by reacting propylene oxide with toluenediamine in mole ratios of 4:1 to 9:1 at temperatures greater than 140° C. in the presence of at least 0.6 part of alkali metal hydroxide per 100 parts of toluenediamine with the proviso that at least 0.8 part of alkali metal hydroxide is used if the toluenediamine is 2,4-toluenediamine or 2,6-toluenediamine, or mixtures thereof.

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**4,391,729**

**METAL OXIDE COMPOSITE CATHODE MATERIAL FOR HIGH ENERGY DENSITY BATTERIES**

**Charles C. Liang, Clarence; M. Elizabeth Bolster, East Amherst, and Robert M. Murphy, Lancaster, all of N.Y., assignors to Wilson Greatbatch Ltd., Clarence, N.Y.**

**Division of Ser. No. 104,384, Dec. 17, 1979, Pat. No. 4,310,609. This application Jun. 30, 1980, Ser. No. 164,891**

**Int. Cl.³ H01M *4/04, 6/14***

**U.S. Cl. 252—182.1** **14 Claims**

1. A method of making a composite cathode comprising at least one metal oxide, metal or mixtures of metals and metal oxides in the matrix of a host metal oxide which comprises:

thermally treating by heating above decomposition temperature a mixture of a host metal oxide and a thermally decomposable metal compound of a metal selected from the group consisting of Groups IB, IIB, IIIB, IVB, VB, VIB, VIIB and VIII, and

forming the resultant mass into said cathode.

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**4,391,730**

**NEMATIC LIQUID CRYSTAL COMPOUNDS AND USE AND DEVICE FOR USING THE SAME**

**Frank Kuschel; Dietrich Demus, both of Halle; Doris Pfeiffer, Steinbach, and Hans-Joachim Deutscher, Halle, all of German Democratic Rep., assignors to VEB Werk fuer Fernsehelektronik Berlin im VEB Kombinat Mikroelektronik, Berlin, German Democratic Rep.**

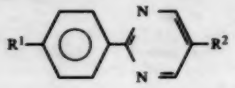
**Continuation of Ser. No. 65,397, Aug. 9, 1979, abandoned. This application Sep. 2, 1980, Ser. No. 183,567**

**Int. Cl.³ C09K *3/34*; G02F *1/13***

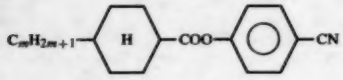
**U.S. Cl. 252—299.1** **11 Claims**

1. A nematic liquid crystal composition for use in electro-optical devices for modulating transmitted or reflected light and

for the rendition of numerals, symbols and images, comprising a mixture of at least one compound of formula (A)



wherein $R^1$ is $C_nH_{2n+1}O-$ and $R^2$ is $C_nH_{2n+1}-$, where n=1 to 12, and at least one compound of formula (B)



where m=1 to 10.

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**4,391,731**

**HYDROGENATED NAPHTHALENES**

**Arthur Boller, Binningen; Martin Schadt, Seltisberg, and Alois Villiger, Basel, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

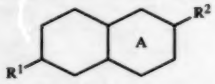
**Filed Aug. 3, 1981, Ser. No. 289,676**

**Claims priority, application Switzerland, Aug. 14, 1980, 6130/80; May 27, 1981, 3482/81**

**Int. Cl.³ C09K** *3/34;* **C07C** *69/753, 121/46*

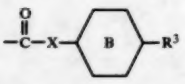
**U.S. Cl. 252—299.62** **15 Claims**

1. A compound of the formula



I

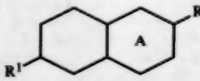
wherein ring A is saturated or aromatic and a saturated ring A which may be present is trans-linked with the second ring; $R^1$ is straight-chain alkyl or alkoxy group containing 1 to 11 carbon atoms; $R^2$ is cyano, an ester group of the formula



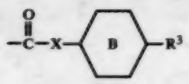
II

wherein ring B is either aromatic, X is oxygen or sulfur and $R^3$ is cyano or straight-chain alkyl or alkoxy containing 1 to 10 carbon atoms, or ring B is trans-1,4-di-substituted cyclohexane, X is oxygen and $R^3$ is cyano or straight-chain alkyl containing 1 to 10 carbon atoms; and the total number of carbon atoms in the alkyl and/or alkoxy groups comprises at most 12.

15. A liquid crystal mixture containing at least two components, wherein at least one component is a compound of the formula



wherein ring A is saturated or aromatic and a saturated ring A which may be present is trans-linked with the second ring; $R^1$ is straight-chain alkyl or alkoxy group containing 1 to 11 carbon atoms; $R^2$ is cyano, straight-chain alkyl containing 1 to 11 carbon atoms, an ester group of the formula



or, when ring A is saturated, additionally a straight-chain alkoxy group containing 1 to 11 carbon atoms; in the ester group of formula II ring B is either aromatic, X is oxygen or sulfur and $R^3$ is cyano or straight-chain alkyl or alkoxy containing 1 to 10 carbon atoms, or ring B is trans-1,4-di-substituted cyclohexane, X is oxygen and $R^3$ is cyano or straight-chain alkyl containing 1 to 10 carbon atoms; and the total number of carbon atoms in the alkyl and/or alkoxy groups comprises at most 12.

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**4,391,732**

**PHYTOSTEROL BLENDS**

**Larry D. Lundmark, Richfield, Minn., assignor to Henkel Corporation, Minneapolis, Minn.**

**Division of Ser. No. 584,319, Jun. 6, 1975, Pat. No. 4,218,334. This application Apr. 25, 1979, Ser. No. 32,988**

**Int. Cl.³ B01F** *17/34, 17/38*

**U.S. Cl. 252—356** **5 Claims**

1. A blend consisting essentially of from about 10 to 50 percent phytosterol and from about 50 to 90 percent of a member selected from the group consisting of free saturated fatty alcohols having an even number of carbon atoms from 12 to 18 in number, said blend being substantially free of triglyceride.

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**4,391,733**

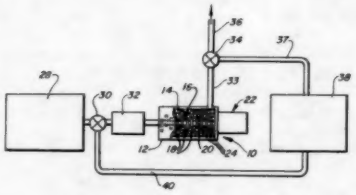
**MINERAL TREATMENT AND COMPOSITION**

**Richard S. Lamar, Littletown, Colo.; Laurence E. Ferreira, Pacific Palisades, and Robert C. Cloud, Thousand Oaks, both of Calif., assignors to Standard Oil Company (Indiana), Chicago, Ill.**

**Filed Aug. 28, 1981, Ser. No. 297,274**

**Int. Cl.³ C04B** *33/02, 33/04*

**U.S. Cl. 252—378 R** **19 Claims**




1. A method for treating a phyllosilicate mineral comprising:

(a) forming a slurry comprising up to about 40 weight percent of phyllosilicate mineral particles in an organic liquid having a dielectric constant less than 35 and in the absence of a liquid having a dielectric constant of at least 35;

(b) grinding the slurry at a sufficiently low temperature to avoid substantial loss of the liquid through vaporization and with sufficient force to form a particulate composite of the phyllosilicate mineral particles and an organic material present in or formed from the organic liquid during grinding and to fracture the particulate composite and thereby to produce first particulate composite materials having a greater specific surface area than the phyllosilicate mineral particles from which they were formed; and

(c) separating the first particulate composite materials from the organic liquid; and

(d) treating the separated first particulate composite materials with a polar fluid having a dielectric constant of at least 60 to form second particulate composite materials

having a greater specific surface area than the first particulate composite materials.

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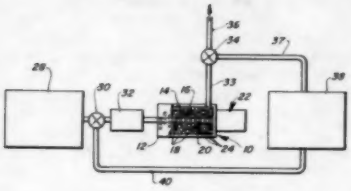
**4,391,734**

## MINERAL TREATMENT AND COMPOSITION

**Laurence E. Herreira, Pacific Palisades, Calif.; Richard S. Lamar, Littletown, Colo., and Ralph J. Bertolacini, Naperville, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.**

**Filed Feb. 28, 1981, Ser. No. 297,275**
**Int. Cl.³ C04B *33/02, 33/04***
**U.S. Cl. 252—378 R** **15 Claims**




1. A method for treating a phyllosilicate mineral comprising:
(a) forming a slurry comprising up to about 40 weight percent of phyllosilicate mineral particles in an organic liquid having a dielectric constant less than 35 and in the absence of a liquid having a dielectric constant of at least 35;
(b) grinding the slurry at a sufficiently low temperature to avoid substantial loss of the liquid through vaporization and with sufficient force to form a particulate composite of the phyllosilicate mineral particles and an organic material present in or formed from the organic liquid during grinding and to fracture the particulate composite and thereby to produce particulate composite materials having a greater specific surface area than the phyllosilicate mineral particles from which they were formed; and
(c) separating the particulate composite materials from the organic liquid.

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**4,391,735**

## CLEANING AND REGENERATING ETHYLENE OXIDE CATALYSTS

**Paul J. Busse, Omaha, Nebr., assignor to InterNorth, Inc., Omaha, Nebr.**

**Filed Jul. 17, 1981, Ser. No. 284,207**
**Int. Cl.³ B01J *23/96, 23/50*; C07D *301/10***
**U.S. Cl. 252—413** **15 Claims**

1. A method for removing alkali metal-containing impurities from supported silver catalysts which have been used for the direct oxidation of ethylene to ethylene oxide which comprises washing the catalyst with a composition which is comprised of in inert organic liquid and about 0.1% to about 10%, by weight, of solubilizing agent which is selected from the group consisting of aliphatic and aromatic acids.

6. A method of regenerating a supported silver catalyst which has been used for the direct oxidation of ethylene to ethylene oxide which comprises washing the catalyst to remove alkali metal-containing impurities with a composition comprised of an inert organic liquid and about 0.1% to about 10%, by weight, of a solubilizing agent which is selected from the group consisting of aliphatic and aromatic acids, and then applying to the catalyst from 1 to 1000 parts per 1 million parts of catalyst of cesium, rubidium, or a mixture thereof.

11. In a method for regenerating a supported silver catalyst which has been used for the direct oxidation of ethylene to ethylene oxide which comprises washing the catalyst with an inert organic liquid and then applying to the catalyst from 1 to 1000 parts per 1 million parts of catalyst of cesium, rubidium, or a mixture thereof, the improvement which comprises removing alkali metal-containing impurities by including about 0.1% to about 10% by weight, of a solubilizing agent in the inert organic liquid, said solubilizing agent selected from the group consisting of aliphatic and aromatic acids.

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**4,391,736**

## ALPHA-OLEFIN POLYMERIZATION

**Charles E. Capshew, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.**

**Filed Jun. 5, 1981, Ser. No. 270,695**
**Int. Cl.³ C08F *4/02, 4/64***
**U.S. Cl. 252—429 B** **10 Claims**

1. A method for producing a catalyst comprising
(1) reacting a first component comprising the product of a reaction between a magnesium dihalide and a tetraalkyl titanate with a second component comprising the product of a reaction between a substantially anhydrous particulate hydroxyl-containing refractory carrier and an organometal compound of a metal of Group I to V and then
(2) reacting the resulting solid with titanium tetrahalide.

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**4,391,737**

## CATALYSTS FOR RING-OPENING COPOLYMERIZATION OF CYCLOOLEFINS

**Anthony J. Bell, Stow, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Jun. 11, 1981, Ser. No. 272,635**
**Int. Cl.³ C08F *4/62***
**U.S. Cl. 252—429 B** **4 Claims**

1. A catalyst for a ring-opening copolymerization, consisting of:
a compound of (a) the reaction product of tungsten hexachloride and a 1,2- or 1,3-dioxy compound selected from the group consisting of 2,4-pentadione, 2-formylphenol, 1,3-diphenyl-1,3-propanedione, said reaction product forming a bidentate ligand; and a compound (b) having the formula $R\text{-}AlCl_2$ wherein R is an alkyl group having from 2 to 5 carbon atoms, the molar ratio of (b) to (a) ranging from about 2 to about 6, the amount of said tungsten chloride to said dioxy compound ranging from 0.9 moles to about 1.5 moles,
said bidentate ligand causing a more favorable comonomer reactivity ratio in the ring-opening copolymerization of Hex COD monomer and a cycloolefin monomer other than cyclohexene, said cycloolefin having from 4 to 12 carbon atoms and at least one non-conjugated double bond.

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**4,391,738**

## CATALYST FOR OLEFINIC POLYMERIZATION

**Arthur W. Langer, Jr., Watchung, N.J., assignor to Exxon Research and Engineering Co., Florham Park, N.J.**

**Continuation of Ser. No. 790,837, Apr. 25, 1977, abandoned, which is a continuation-in-part of Ser. No. 767,749, Feb. 11, 1977, abandoned. This application Jan. 28, 1982, Ser. No. 343,570**
**Int. Cl.³ C08F *4/02, 10/00***
**U.S. Cl. 252—429 B** **1 Claim**

1. An improved catalyst composition adaptable for use in an alpha-olefin polymerization which consists of:
(a) $TiCl_4$ supported on $MgCl_2$, said $TiCl_4$ supported on $MgCl_2$ prepared by ball milling said $TiCl_4$, $MgCl_2$ and ethyl benzoate;
(b) diethylaluminum chloride; and
(c) a mono-organomagnesium compound having the formula:
$R'MgX$
wherein R′ is a sec-butyl group and X is selected from the group consisting of Cl, OOCϕ, $OC_{15}H_{31}$, $OC_2H_5$, $SC_{12}H_{25}$ and Os-Bu.

4,391,739

## ZEOLITE CATALYSTS MODIFIED WITH GROUP IA METALS

Chin-Chiun Chu, North Brunswick, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 146,951, May 5, 1980, Pat. No. 4,329,533. This application Jan. 18, 1982, Ser. No. 339,960
Claims priority, application European Pat. Off., Feb. 19, 1981, 81300672.3
Int. Cl.³ B01J *29/28, 27/18*
U.S. Cl. 252—455 Z 11 Claims

2. A catalyst composition comprising:

a crystalline zeolite material selected from ZSM-5, ZSM-11, ZSM-12, ZSM-23, ZSM-35, ZSM-38 and ZSM-48;

said catalyst composition further comprising at least 0.25 weight percent of one or more Group IA metals selected from lithium, potassium, sodium and cesium incorporated into said composition in the form of a Group IA metal oxide and at least 0.25 weight percent of phosphorus incorporated into said composition in the form of an oxide of phosphorus.

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4,391,740

## LARGE PORE SHAPED HYDROPROCESSING CATALYSTS

Kirk R. Gibson, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Aug. 10, 1981, Ser. No. 291,588
Int. Cl.³ B01J *35/02*
U.S. Cl. 252—470 8 Claims

1. A catalyst for hydroprocessing heavy hydrocarbonaceous feedstocks comprising:

elongated extrudates of catalyst, said catalyst having between 2 and 15 weigh percent of a catalystic metal from Group VIB and between 0 and 10 weight percent of a catalystic metal from Group VIII, where said weight percent is based on the catalytic metal content of the total catalyst weight, calculated as reduced metal, supported on refractory inorganic oxide;

said extrudates having oval cross section and a section extending from the flat surface of the oval;

said extrudate cross section capable of being circumscribed by a rectangle having a first dimension in the range of between about 0.0600 inch to about 0.085 inch, a second dimension, perpendicular to said first dimension in the range of between 0.030 inch to about 0.065 inch;

said elongated extrudate having a surface area to volume ratio of less than 95 reciprocal inches.

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4,391,741

## POLYOXYMETHYLENE COMPOSITION

Junzo Masamoto; Minoru Hamada, both of Kurashiki; Isamu Suzuki, Kawasaki, and Takeo Yoshida, Kurashiki, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 884,223, Mar. 7, 1978, abandoned. This application Jun. 25, 1979, Ser. No. 51,417
Claims priority, application Japan, Mar. 10, 1977, 52-25415
Int. Cl.³ H01B *1/06*
U.S. Cl. 252—511 7 Claims

1. A composition comprising:

(a) 100 parts by weight of polyoxymethylene,

(b) 4 to 10 parts by weight of electrically conductive carbon black selected from the group consisting of oil furnace blacks, furnace blacks and acetylene blacks, and

(c) 10 to 18 parts by weight of low-density polyethylene, wherein said composition has a surface electrical resistance of $10^{13}$ ohms or less.

4,391,742

## PASTE COMPOSITION FOR THE PRODUCTION OF ELECTRICALLY CONDUCTIVE AND SOLDERABLE STRUCTURES

Wolf-Erhard Steigerwald, Rua de Fez, 731, 4.000 Porto, Portugal; Peter Ambros, Am Wacholderrain 12, 8741 Hohenroth Ortsteil Leutershausen, and Erich Gatzke, Wilhelm-Busch-Str. 56, 3260 Rinteln, both of Fed. Rep. of Germany

Continuation-in-part of Ser. No. 918,378, Jun. 23, 1978, Pat. No. 4,248,921. This application Sep. 22, 1980, Ser. No. 189,365
Claims priority, application Fed. Rep. of Germany, Jun. 24, 1977, 2728465
The portion of the term of this patent subsequent to Feb. 3, 1998, has been disclaimed.
Int. Cl.³ H01B *1/06, 1/02*
U.S. Cl. 252—512 7 Claims

1. A paste composition for producing electrically conductive and solderable structures comprising:

about 12 to 40 percent by weight of an organic curable polymer binder, wherein the organic polymer binder is a caprolactam-blocked adduct of isophoronodiisocyanate and an oxyester of the hydroxyl group;

about 40 to 70 percent by weight of electrically-conducting particles, formed as platelets or microscopic crystals and mixtures thereof, wherein the electrically-conducting particles are metal particles, selected from the group consisting of silver, gold, nickel, particles from the platinum group metals, silver or gold coated copper particles and mixtures thereof, to render said binder electrically conducting;

about 5 to 20 percent by weight of metal salt particles, the metal particles being capable of being dissolved by external dissolving agents to render the surface of said composition porous, wherein the metal salt particles are selected from the group consisting of copper (II) sulfate, copper (I) chloride, copper (II) formiate, copper (II) acetate, sodium chloride, sodium sulfide, lithium chloride, sodium carbonate, silver chloride, silver sulfate, silver nitrate and mixtures thereof; and

up to 3 percent by weight of a non-ionic or anionic active wetting agent, which is capable of floating the metal salt particles and concentrating said particles at or near the surface of said paste.

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4,391,743

## COMPOSITION FOR DEPOSITING METALLIC OXIDE FILM COATINGS

Umio Maeda, Fukuoka; Hirofumi Shoji, Toyama; Yasusuke Wada, Johanamachi, and Yoshio Horie, Nakago, all of Japan, assignors to Nippon Soda Company Limited, Tokyo, Japan

Filed Nov. 30, 1981, Ser. No. 325,648
Int. Cl.³ H01B *1/06*
U.S. Cl. 252—518 1 Claim

1. A composition to be dissolved in an organic solvent and applied onto a substrate to deposit a metallic oxide film coating on the substrate, said composition consisting essentially of 100 parts of an indium compound represented by the formula

$$In(X)_l(Y)_m$$

wherein, for said indium compound X denotes a chelate ring material selected from the group consisting of acetylacetone, methyl or ethyl ester of acetoacetic acid, lactic acid, triethanolamine, and mixtures thereof; Y denotes an alkoxide material selected from the group consisting of butyl alcohol, octyl alcohol, octylene glycol, mono-methylether of ethylene glycol, and mixtures thereof; l and m are an integer which is 1 or 2 having the relationship of $l+m=3$; said indium compound being one component of the composition, the other component being from 5 to 20 parts of a tin compound represented by the formula

$$Sn(X')_2 \text{ or } Sn(Y')_{m'}$$

wherein, for said tin compound X' denotes a chelate ring material selected from the group consisting of acetylacetone, methyl acetoacetonate, and mixtures thereof; Y' denotes an alkoxide material selected from the group consisting of butyl alcohol, oxtyl alcohol, and mixtures thereof; and m' is an integer which is 2 or 4.

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4,391,744

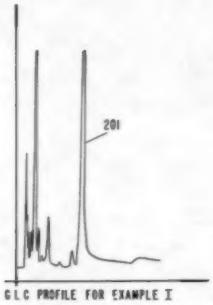
## NORBORNYL OXYACETALDEHYDE, ORGANOLEPTIC USES THEREOF AND PROCESS FOR PREPARING SAME

Robert P. Belko, Woodbridge; Richard M. Boden, Monmouth Beach, and Marie R. Hanna, Hazlet, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 303,012, Sep. 17, 1981. This application Mar. 11, 1982, Ser. No. 357,157

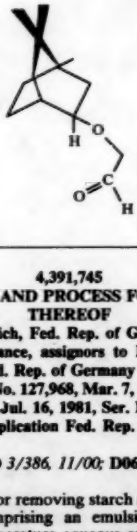
Int. Cl.³ A61K 7/46; C11B 9/00

U.S. Cl. 252—522 R 1 Claim




GLC PROFILE FOR EXAMPLE I

1. The process for augmenting or enhancing the aroma of a consumable material selected from the group consisting of perfumes and colognes comprising the step of adding to a perfume or a cologne base an aroma augmenting or enhancing quantity of the norbornyl oxyacetaldehyde having the structure:



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4,391,745

## DESIZING AGENT AND PROCESS FOR PREPARATION THEREOF

Maria Denkler, Munich, Fed. Rep. of Germany, and Frederic Braun, Vienne, France, assignors to Diamalt Aktiengesellschaft, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 127,968, Mar. 7, 1980, abandoned. This application Jul. 16, 1981, Ser. No. 283,816

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1979, 2909396

Int. Cl.³ C11D 3/386, 11/00; D06L 1/14, 16/00

U.S. Cl. 252—554 8 Claims

1. A composition for removing starch and starch-containing sizing materials comprising an emulsion or dispersion of 10–40% of high temperature aqueous amylase enzyme effective as a desizing agent at about 100° C. or higher, an anionic surfactant present in an amount of 0.5% and a non-ionic surfactant selected from the group consisting of alkyl oxalkylates, alkaryl oxalkylates and fatty acid ethyloxylates present 10–60% with the balance water.

8. A composition for removing starch and starch-containing sizing materials consisting essentially of an emulsion or dispersion of 10–40% of a starch-decomposing aqueous high temperature amylase enzyme, effective as a desizing agent at about 100° C. or higher and 10–60% of a non-ionic surfactant selected from the group consisting of alkylphenol oxalkylate, oxalkylated fatty alcohols and fatty acid othyloxylate, with the balance water.

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4,391,746

## BLOOD-COAGULATION-PROMOTING PRODUCTS AND METHODS OF PREPARING THEM

Gautam Mitra, Kensington; Michael H. Coan, El Cerrito, and Shohachi Wada, Oakland, all of Calif., assignors to Cutter Laboratories, Inc., Berkeley, Calif.

Division of Ser. No. 153,341, May 27, 1980. This application May 5, 1982, Ser. No. 374,835

Int. Cl.³ A61K 35/14, 35/16, 37/02; C07G 7/00

U.S. Cl. 260—112 B 39 Claims

1. A method of producing a blood-coagulation-promoting preparation substantially free of thrombin from human blood plasma, which comprises

(a) contacting a human blood plasma fraction containing coagulation Factors II, VII, IX, and X with an anion exchanger to adsorb the coagulation Factors on the anion exchanger,

(b) eluting the adsorbed coagulation Factors from the anion exchanger,

(c) treating the eluate containing the coagulation Factors to generate a Factor VIII Inhibitor Bypassing Activity (FEIBA) substance substantially free of thrombin, and

(d) treating the eluate to stop the generation of a FEIBA substance.

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4,391,747

## DES ASPARAGINE-3-CALCITONIN

Ronald C. Orlowski, Frankfort, and Jay K. Seyler, Bourbonnais, both of Ill., assignors to Armour Pharmaceutical Company, Tarrytown, N.Y.

Filed Feb. 12, 1982, Ser. No. 348,473

Int. Cl.³ C07C 103/52

U.S. Cl. 260—112.5 T 5 Claims

1. Des-X³-calcitonin, where X is asparagine wherein the calcitonin is salmon, havine, porcine, ovine or eel.

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4,391,748

## PROCESS FOR PREPARING PALATABLE SOYA PROTEINS AND PRODUCT THUS OBTAINED

Aldo Ferrero, c/o F. Merck, Postfach 4119, 6100 Darmstadt, Fed. Rep. of Germany

Filed Apr. 29, 1981, Ser. No. 258,847

Claims priority, application Italy, May 2, 1980, 21735 A/80

Int. Cl.³ A23J 1/14

U.S. Cl. 260—123.5 9 Claims

1. A process for preparing palatable soya protein consisting essentially of baking extruded, textured soya protein, which has been previously dried so as to contain up to 10% of moisture, at a temperature of 40° C. to 120° C. for 3 to 14 hours thereby obtaining a product which is per se palatable.

4,391,749

## METHOD FOR THE PURIFICATION OF COLLAGENS

Eva S. Engvall, and Erkki I. Ruoslahti, both of Olivenhain, Calif., assignors to La Jolla Cancer Research Foundation, La Jolla, Calif.

Filed Oct. 19, 1981, Ser. No. 313,326
Int. Cl.³ A61K 35/16; C07G 7/00; C08H 1/06; C09H 1/00
U.S. Cl. 260—123.7 10 Claims

1. Affinity matrix material for separating collagen from other high molecular weight proteinaceous substances comprising:

solid chromatographic support material; and

at least one fragment of fibronectin which retains thereupon collagen binding sites, said fragment having been severed from other binding sites of intact fibronectin, said fragment being coupled with said solid chromatographic support material leaving collagen binding sites thereof exposed to selectively bind collagenous material when used chromatographically without binding interfering high molecular weight non-collagenous proteinaceous substances.

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4,391,750

## HEAT GELLABLE PROTEIN ISOLATE

Jennifer M. Grealy, Gores Landing, and Terrence J. Maurice, Colborne, both of Canada, assignors to General Foods Inc., Toronto, Canada

Filed Dec. 22, 1982, Ser. No. 452,035
Int. Cl.³ A23J 1/12, 1/14
U.S. Cl. 260—123.5 27 Claims

1. An aqueous protein dispersion suitable for heat gelation to a gel, which comprises a composition dispersed in an aqueous phase having an ionic strength of about 0.3 to about 0.75 molar and a pH of about 4.5 to about 5.5, said composition comprising at least 70% by weight of a substantially undenatured vegetable protein isolate and up to about 30% by weight of a starch, said vegetable protein isolate being one formed by settling an aqueous dispersion of protein micelles consisting of homogenous amphiphilic protein moieties.

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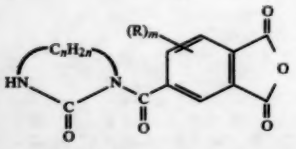
4,391,751

## PHTHALIC ANHYDRIDE DERIVATIVES

Chung-Yuan Lin, Northford, Conn., assignor to The Upjohn Company, Kalamazoo, Mich.

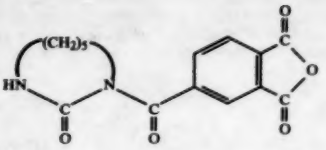
Filed Mar. 8, 1982, Ser. No. 356,047
Int. Cl.³ C07D 401/06, 403/06; C08G 69/16
U.S. Cl. 260—239.3 R 9 Claims

1. A compound having the formula



wherein $C_nH_{2n}$ represents alkylene containing from 2 to 6 carbon atoms in the chain separating the valencies, R is an inert substituent selected from the class consisting of lower-alkyl, lower-alkoxy, lower-alkenyl, lower-alkenyloxy, lower-alkylmercapto, cyano and trifluoromethyl, and m is an integer from 0 to 3.

5. A compound according to claim 1 wherein $C_nH_{2n}$ is pentamethylene and m=0, said compound being 4-(N,N'-pentamethyleneallophanyl)phthalic anhydride corresponding to the formula:



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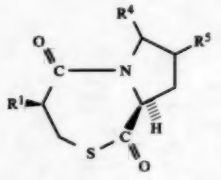
4,391,752

## PROCESS FOR PREPARING 5H-PYRROLO[2,1-C]-[1,4]THIAZEPINE-1,5-DIONES

Roger Crossley, Reading, England, assignor to John Wyeth and Brother Limited, Maidenhead, England

Division of Ser. No. 236,350, Feb. 20, 1981, Pat. No. 4,349,480.
This application May 10, 1982, Ser. No. 376,356
Claims priority, application United Kingdom, Feb. 26, 1980, 8006414
Int. Cl.³ C07D 513/04
U.S. Cl. 260—239.3 B 4 Claims

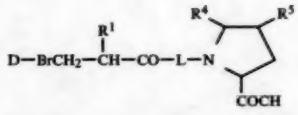
1. A process for preparing a compound of formula XI



(XI)

wherein $R^1$ is lower alkyl, $R^4$ and $R^5$ either both represent hydrogen or together with the carbon atoms to which they are attached represent a fused benzene ring optionally substituted by a group selected from hydroxy, lower alkyl, lower alkoxy and halogen, which comprises selecting a process from the group consisting of

(a) reacting a compound of formula



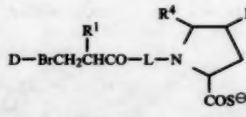
(VII)

substantially free from the L,L isomer, wherein $R^1$, $R^4$ and $R^5$ are as defined above with a haloformate ester and a sulphide of formula XII

(XII)

wherein Y represents hydrogen or an alkali metal, with the proviso that when Y is hydrogen the reaction is carried out in the presence of base, and cyclising the product by heating, and

(b) cyclising by heating a compound of formula (XIII)



(XIII)

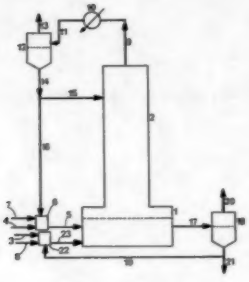
substantially free of L,L stereoisomer wherein $R^1$, $R^4$ and $R^5$ are as defined above and $B^{\oplus}$ is a cation.

4,391,753

## PROCESS FOR THE MANUFACTURE OF CARBOXYLIC PERACIDS

Nicolas Hardy, Jemeppe-sur-Sambre; Luc Lerot, and Rene Walraevens, both of Brussels, all of Belgium, assignors to Propylox, Brussels, Belgium

Division of Ser. No. 24,372, Mar. 27, 1979, Pat. No. 4,267,124. This application Jan. 15, 1981, Ser. No. 225,189
Claims priority, application France, Mar. 28, 1978, 78 09199
Int. Cl.³ C07D 301/14
U.S. Cl. 549—525 15 Claims



1. In a continuous process for the manufacture of an olefin oxide from an olefin by reaction of the olefin with a carboxylic peracid comprising:

(a) preparing the carboxylic peracid by reaction, in a reaction mixture, of the corresponding carboxylic acid with hydrogen peroxide in the presence of a catalyst and in the presence of an inert organic liquid which is contained in an organic phase and is a solvent for the peracid and is capable of forming a heterogeneous azeotrope with water, said organic liquid having a higher boiling point that that of the olefin and the olefin oxide, does not form an azeotrope with the olefin and the olefin oxide, and of which the possible azeotropes with the carboxylic acid and the carboxylic peracid have a higher boiling point than that of the olefin and the olefin oxide, removing water present in the reaction mixture by distillation of the water/organic liquid azeotrope, and maintaining a sufficient amount of water in the reaction mixture to allow the formation of an aqueous phase which is separate from the organic phase which contains the organic liquid and the carboxylic peracid;

(b) withdrawing part of the reaction mixture of step (a), and then separating the aqueous phase from the organic phase, by decantation, of the part of the reaction mixture which has been withdrawn;

(c) introducing the separated aqueous phase of step (b) into the reaction mixture of step (a);

(d) reacting an olefin with the carboxylic peracid in the separated organic phase obtained in step (b) to form a reaction mixture containing unreacted olefin, olefin oxide, carboxylic acid and organic liquid;

(e) subjecting the reaction mixture of step (d) to a separation to obtain unreacted olefin and an organic solution containing organic liquid, olefin oxide, and carboxylic acid;

(f) distilling the organic solution obtained in step (e) to separate the olefin oxide from the carboxylic acid and organic liquid; and

(g) feeding the separated carboxylic acid and organic liquid of step (f) to step (a).

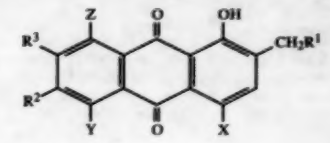
4,391,754

## ANTHRAQUINONE COMPOUNDS

Andrew H. M. Renfrew, Bury, England, assignor to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 173,351, Jul. 29, 1980, abandoned. This application Mar. 29, 1982, Ser. No. 363,223
Int. Cl.³ C07C 97/26, 49/74
U.S. Cl. 260—380 4 Claims

1. An anthraquinone compound of the formula:



wherein

$R^1$ represents an alkyl radical containing from 1 to 20 carbon atoms;

X is H, $NH_2$ or $NHCH_3$;

one of Y and Z is OH and the other is H, $NH_2$ or $NHCH_3$; and

one of $R^2$ and $R^3$ is H and the one that is ortho to the OH group is a $—CH_2R^1$ radical.

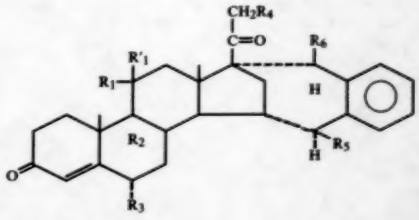
4,391,755

## STEROID MONOHYDRATES, FORMULATIONS CONTAINING SAME AND METHOD

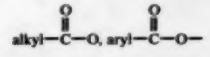
Yu-Chang J. Wang, North Brunswick; Dürsch Friedrich, Hopewell; Richard L. O'Laughlin, North Brunswick, and Thaddeus Prusik, Roosevelt, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Jan. 18, 1982, Ser. No. 340,127
Int. Cl.³ C07J 5/00; A61K 31/56
U.S. Cl. 260—397.45 14 Claims

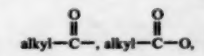
1. A method for forming the monohydrate of a steroid, said monohydrate having an average particle size of less than about 20 microns, said steroid having the structure



wherein $R_1$ is chlorine, fluorine or hydroxy and $R'_1$ is hydrogen or $R_1$ and $R'_1$ together are =O; $R_2$ is hydrogen or halogen; $R_3$ is hydrogen, methyl or fluorine; $R_4$ is hydrogen, hydroxy,



or halogen; and $R_5$ and $R_6$ are the same or different and are hydrogen, alkyl, alkylthio, alkoxy, carboalkoxy, formyl,



hydroxy, halogen, phenyl or cyano, with the proviso that when $R_5$ and $R_6$ are different, one of $R_5$ and $R_6$ is hydrogen, which method includes the steps of micronizing the steroid in

anhydrous form, introducing the micronized anhydrous steroid into water to hydrate the steroid to form the corresponding monohydrate and cause crystal growth, reducing the average particle size of the crystals of hydrated steroid suspended in water to below about 25 microns to form particles of steroid monohydrate having a relatively stable crystal size.

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**4,391,756**

## ORGANO-MONOVALENT AURUS COMPLEX CATALYSTS FOR THE MANUFACTURE OF OLEFIN OXIDES

**Philip L. Kuch, Warrensville Heights; Daniel R. Herrington, Chesterland, and Janet M. Eggett, Parma, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio**

**Division of Ser. No. 912,620, Jun. 5, 1978, abandoned. This application Dec. 13, 1978, Ser. No. 969,124**

**Int. Cl.³ C07F 1/12; B01J 31/24, 31/18, 31/26**

**U.S. Cl. 260—430** **2 Claims**

1. The catalyst complex represented by the empirical formula:

$$Au^{I}LY$$

wherein

L is a neutral coordinating $\pi$-acid type ligand; and

Y is a uninegative non-coordinating anion selected from the group consisting of $F_3CSO_3^-$, $BF_4^-$, $PF_6^-$, $ClO_4^-$, $AlCl_4^-$ and picrate.

2. The catalyst complex of claim 1 wherein Y is $F_3CSO_3^-$ or $AlCl_4^-$.

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**4,391,757**

## ORGANIC ANTIMONY CONTAINING STABILIZER COMPOSITIONS FOR HALOGENATED POLYMERS

**Thomas G. Kugele, and Dennis W. Gilmore, both of Cincinnati, Ohio, assignors to Carstab Corporation, Reading, Ohio**

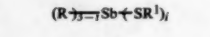
**Filed Nov. 27, 1981, Ser. No. 325,512**

**Int. Cl.³ C09K 15/32**

**U.S. Cl. 260—446** **4 Claims**

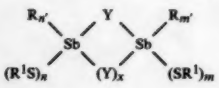
1. A composition comprising:

A. At least one organic antimony compound containing at least one antimony to sulfur to carbon linkage and being selected from compounds having the formulas:



(I)

and

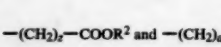


(II)

wherein

R is selected from the group consisting of alkyl, aryl, cycloalkyl, cycloalkenyl, aralkyl, alkaryl, and alkenyl;

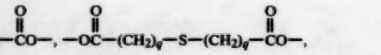
$R^1$ is selected from the group consisting of alkyl, aryl, cycloalkyl, cycloalkenyl, aralkyl, alkaryl, alkenyl,



$R^2$ is hydrogen, alkyl, aryl, alkenyl, cycloalkyl or alkoxyalkyl;

$R^3$ is alkyl, aryl, cycloalkyl or alkenyl;

Y is selected from the group consisting of



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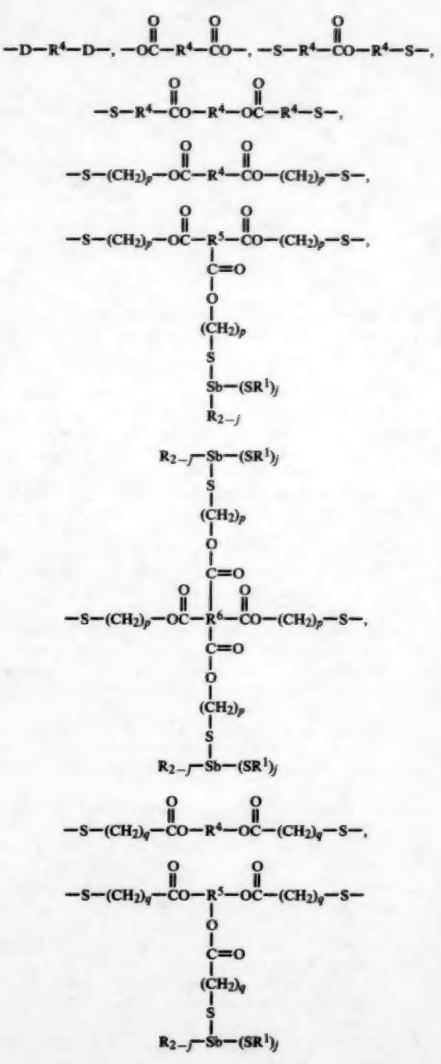

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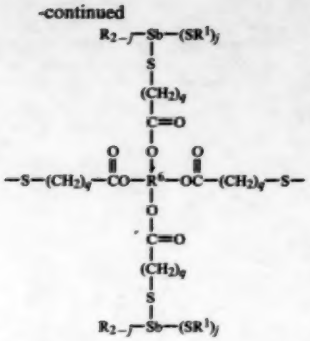
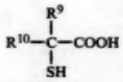


$R^4$ is alkylene, arylene, or alkenylene;
$R^5$ is a trivalent alkyl or aryl radical;
$R^6$ is a tetravalent alkyl or aryl radical;
D is oxygen or sulfur;
i=1, 2 or 3;
j=1 or 2;
m=1 or 2 and m′=0 or 1;
n=1 or 2 and n′=0 or 1;
x is 0 or 1 with the proviso that when x=0 then m+m′=2 and n+n′=2, and when x=1 then m=1, m′=0, n=1 and n′=0;
z is 1, 2 or 3;
a is 2, 3 or 4;
q is 1, 2 or 3; and
p is 2, 3 or 4;

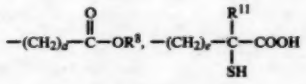
B. elemental sulfur in an amount from about 0.03% to about 3.0% by weight based on the weight of the organic antimony compound; and

C. in an amount from about 0.5% to about 25% by weight based on the weight of the organic antimony compound of at least one 2-mercaptocarboxylic acid selected from compounds having the formula:



(III)

where $R^9$ and $R^{10}$ are the same or different and are selected from hydrogen, alkyl, aryl, aralkyl, alkaryl, cycloalkyl, alkenyl, carboxyl,



where $R^8$ is hydrogen, alkyl, aryl, aralkyl, alkaryl, cycloalkyl, cycloalkenyl, or alkenyl; $R^{11}$ is hydrogen, alkyl or aryl; d is 1 to 6 and e is 1 to 10; or $R^9$ and $R^{10}$ together form an alicyclic ring.

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**4,391,758**

## PROCESS FOR METHYL ISOCYANATE PRODUCTION

**Placido M. Spaziante, 7, Via San Michele, 6900 Lugano, Switzerland, and Luigi Giuffre, Via Passo di Fargorida 6, Milan, Italy**

**Filed Apr. 19, 1982, Ser. No. 369,549**
**Int. Cl.³ C07C 118/00**
**U.S. Cl. 260—453 P** **18 Claims**

1. A process for the preparation of methyl isocyanate comprising reacting methylcarbamoyl chloride with about a stoichiometric amount of an acid acceptor selected from the group consisting of dimethylurea, urea, alkyl ureas and biuret in an organic solvent in which said acid acceptor is soluble and in which the hydrochloride salt of said acid acceptor is insoluble, separating the acid acceptor hydrochloride from the liquid phase, recovering methyl isocyanate by distillation from said liquid phase, and thermally decomposing said acid acceptor hydrochloride salt to regenerate said acid acceptor.

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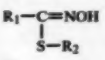
**4,391,759**

## PROCESS FOR THE PREPARATION OF ORGANOTHIOALDOXIME COMPOUNDS

**John K. Chan, Charleston, W. Va., assignor to Union Carbide Corporation, Danbury, Conn.**

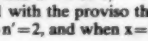
**Filed Mar. 25, 1981, Ser. No. 247,368**
**Int. Cl.³ C07C 119/18**
**U.S. Cl. 260—453.3** **22 Claims**

1. A process for preparing an organothioaldoxime compound of the formula:



by the steps of:

(a) reacting an aldoxime of the formula:



or an α-hydroxyiminoketone of the formula:

with an alkaline hypohalite in an acidic medium to form the corresponding 1-haloaldoxime, said acidic medium comprising an acid added in an amount of from about 0.5 to about 4.0 equivalents for each mole of alkaline hypohalite used; and

(b) reacting said 1-haloaldoxime with an alkali metal mercaptide salt of the formula:

to form said organothioaldoxime compound, wherein the reactions of said steps (a) and (b) are conducted in an aqueous medium and wherein M denotes an alkali metal cation and $R_1$, $R_2$ and $R_3$ are individually alkyl, alkoxyalkyl, cycloalkyl, phenyl or phenylalkyl, all of which may be either unsubstituted or substituted with one or more alkyl, halo, alkoxy, cyano, nitro or dialkylamino substituents.

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**4,391,760**

## S-(TERTIARY ALKYL) ALKYLPHOSPHONOTHIOIC HALIDES

**Mohamed A. Fahmy, Princeton, N.J., assignor to Rhone-Poulenc Agrochimie, Lyons, France**

**Filed Dec. 31, 1980, Ser. No. 221,642**
**Int. Cl.³ C07F 9/20**
**U.S. Cl. 260—961** **6 Claims**

1. A compound of the formula

wherein R is alkyl of 1 to 8 carbon atoms, $R_1$ is tertiary alkyl of 4 to 8 carbon atoms and X is halogen.

## 4,391,761
## PROCESS FOR THE PRODUCTION OF ARYL PHOSPHONYL COMPOUNDS

**Hans-Dieter Block, and Hans Dahmen, both of Cologne, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

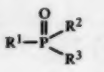
**Filed Jun. 12, 1981, Ser. No. 272,871**

**Claims priority, application Fed. Rep. of Germany, Jul. 4, 1980, 3025377**

**Int. Cl.³ C07F *9/40, 9/53***

**U.S. Cl. 260—969** **4 Claims**

1. Process for the production of aryl phosphonyl compounds of the general formula



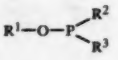
I

wherein

$R^1$ represents a mono- or polynuclear $C_6$-$C_{14}$ aryl radical, which can be substituted by chlorine, fluorine or by alkyl, aryl, alkoxy, aryloxy, alkenyl or cyano radicals,

$R^2$ and $R^3$, independently of each other represent an alkyl, alkenyl or aryl radical or a radical of the structure O-$R^5$, in which $R^5$, independently of $R^1$, has the same meaning as $R^1$,

by the catalytic rearrangement of aryloxy phosphines of the general formula II



II

wherein

$R^1$, $R^2$ and $R^3$ have the meanining indicated above, characterized in that the rearrangement is carried out in the presence of aromatic bromine compounds and a zero-valent nickel catalyst selected from the group consisting of elemental nickel, a complex of nickel (o) with a trialkyl phosphite, a triaryl phosphite, a phosphonous acid ester, a phosphinous acid ester, a phosphine, phosphorus trifluoride, an isonitrile, an amine, a nitrogen oxide, carbon monoxide, and a compound of nickel in an oxidation state higher than zero wherein the nickel is converted to zero-valent nickel under the reaction conditions.

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## 4,391,762
## AERATED DRINKS MACHINE

**Robert P. Child, and Barry G. Charles, both of Hampshire, England, assignors to Thorn Emi Domestic Electrical Appliances Limited, London, England**

**Filed Jan. 15, 1982, Ser. No. 339,684**

**Claims priority, application United Kingdom, Jan. 16, 1981, 8101415**

**Int. Cl.³ B01F *3/04***

**U.S. Cl. 261—121 R** **4 Claims**

1. An appliance for making an aerated beverage, said appliance comprising, in combination:

(a) a casing;

(b) a connection carried by the casing for mounting a container of pressurized liquid carbon dioxide;

(c) a housing for a bottle of water carried by said casing;

(d) a nozzle communicating with said connection and extending downwardly within said housing;

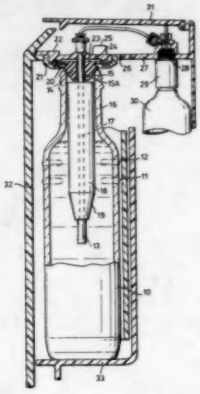
(e) a stopper positioned effective to engage in the neck of a bottle mounted within said housing;

(f) means for supporting the bottle in the housing so that the stopper is engaged therein;

(g) a manually operable valve selectively allowing carbon dioxide to flow from a container mounted on said connection to said nozzle;

(h) a safety pressure valve connected to the interior of the bottle when the stopper is engaged in its neck; and

(i) a displacement body associated with said nozzle and capable of being passed into the neck of the bottle, said displacement body displacing a significant volume of air



and/or of water, whereby when a bottle partly filled with water is in position, and the nozzle and displacement body are therein, the level of the water is such as to leave only a small volume of air thereabove and around the displacement body.

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## 4,391,763
## PROCESS FOR THE MANUFACTURE OF HALOGEN-CONTAINING RESIN PARTICLES OF LARGER BULK DENSITY COMPRISING MIXING PARTICLES OF THE RESIN WITH INORGANIC SALTS, TREATED IN A MIXTURE IN A GASEOUS PHASE AND SEPARATING THE INORGANIC SALT FROM THE PRODUCT

**Kunihiko Ueno; Akiyasu Ishii; Masazi Hukuda, and Kazuyuki Nakayama, all of Iwaki, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 12, 1981, Ser. No. 223,947**

**Claims priority, application Japan, Jan. 11, 1980, 55-1865**

**Int. Cl.³ B29C *23/00***

**U.S. Cl. 264—15** **3 Claims**

1. A process for the manufacture of spherical particles, having a heavier bulk specific gravity, of halogen-containing ethylene resin prepared from at least one monomer selected from vinylidene fluoride, vinyl fluoride, chlorotrifluoroethylene, trifluoroethylene, tetrafluoroethylene, vinylchloride, vinylidene chloride and vinyl bromide, said process comprising in combination of; a step of mixing 100 wt. parts of particles of the said resin with 20–500 wt. parts of one or more of the heat-resisting inorganic salts having particle sizes of 0.01–50 , which are in the form of stable particles at a temperature higher than the melting point of said halogen-containing ethylene resin; a step for heat-treating said mixture in a gaseous phase at a temperature higher than melting point of the said resin; and a further step for separating said inorganic salt or salts from the heat-treated intermediate products.

4,391,764

## METHOD OF MANUFACTURE OF IDENTICAL PARTS DISPLAYING DIFFERENT INDICIA

Egon Edinger, Graefelfing, and Gerd Kohler, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Oct. 15, 1981, Ser. No. 311,875

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1980, 3044722

Int. Cl.³ B41M 5/26

U.S. Cl. 264—25 8 Claims

1. In the method of producing identically shaped plastic keys having different readable indicia on a surface thereof which comprises the steps of preparing a mixture of a base plastic material and a filler material, molding the keys by injection molding with at least a surface portion of the key formed of the mixture, providing a laser beam, focusing the energy radiation in the beam, moving the key surface and beam with respect to one another in a predetermined pattern whereby the beam plays over the surface in a path corresponding to the desired readable indicia, the improvement of the filler material being selected from one of the group of carbon black and graphite, the beam having sufficient power to combust at least a portion of the filler material within the plastic key adjacent the surface without substantial combustion of the base material adjacent the combusted filler material.

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4,391,765

## MICROWAVE CURED SILICONE ELASTOMERIC FOAM

Chi-long Lee, and Sherwood Spells, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Jun. 25, 1982, Ser. No. 392,402

Int. Cl.³ B29H 5/26

U.S. Cl. 264—26 8 Claims

1. A method of drying a stable froth produced from an aqueous silicone emulsion suitable to provide an elastomeric product upon removal of the water comprising

(i) mechanically generating a stable froth from a silicone emulsion comprising 100 parts by weight of anionically stabilized hydroxyl endblocked polydiorganosiloxane having an average molecular weight of greater than 10,000, in the form of an aqueous emulsion having a pH in the range of 9 to 11.5 inclusive; at least one part by weight colloidal silica; an organic tin compound; and water; adding sufficient anionic or nonionic surfactant and thickener to make the froth stable until the water is removed in step (ii), and then,

(ii) exposing the stable froth to sufficient microwave energy to remove the water from the emulsion, thereby forming an elastomeric cured foam.

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4,391,766

## EXTRACTION OF POLY(β-HYDROXYBUTYRIC ACID)

Peter J. Barham, Bristol, and Alan Selwood, Harrogate, both of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation-in-part of Ser. No. 174,836, Aug. 4, 1980, Pat. No. 4,360,488. This application Feb. 12, 1982, Ser. No. 348,325

Claims priority, application United Kingdom, Aug. 13, 1979, 7928172; Feb. 12, 1981, 8104312

Int. Cl.³ D01D 5/12

U.S. Cl. 264—210.1 10 Claims

1. A process for the separation of a polymer containing at least 50 mole % of β-hydroxybutyric acid residues in the polymer chain from micro-organism cells comprising

(a) extracting the polymer from the cells by contacting the polymer-containing cells with a solvent in which the polymer is soluble at the extraction temperature but in which extracted polymer, which has been freshly precipitated and not heated to above 40° C., is not soluble at temperatures below 25° C.,

(b) separating the solution of the polymer in said solvent from the micro-organism cell residue,

(c) causing said solution to gel,

(d) subjecting said gel to a non-random deformation process whereby the bulk of the solvent is expelled from said gel, and

(e) using at least the bulk of said expelled solvent for extraction of polymer from a further quantity of the polymer-containing cells.

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4,391,767

## COATED POLYESTER FILMS

Gordon E. A. Pears, Welwyn Garden City, England, assignor to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 954,772, Oct. 16, 1978, abandoned, which is a continuation of Ser. No. 741,997, Nov. 15, 1976, abandoned, which is a continuation of Ser. No. 257,297, May 26, 1972, abandoned, which is a division of Ser. No. 52,763, Jul. 6, 1970, abandoned. This application Sep. 17, 1980, Ser. No. 188,144

Claims priority, application United Kingdom, Jul. 15, 1969, 35556/69

The portion of the term of this patent subsequent to Jun. 25, 1991, has been disclaimed.

Int. Cl.³ D01F 13/04, 11/08

U.S. Cl. 264—210.3 9 Claims

1. A process for the production of a synthetic linear polyester film which comprises melt extruding a substantially amorphous polyester film, drawing the film in the longitudinal direction, thereafter applying a primer coating comprising a thermosetting acrylic or methacrylic composition, wherein the acrylic or methacrylic component is crosslinkable, to one or both sides of said film, then drawing the coated film in the transverse direction, and heat setting the biaxially oriented and coated film, whereby a primer coating of the thermoset acrylic or methacrylic composition, wherein the acrylic or methacrylic component is thermoset, of thickness of at least $10^{-7}$ inch is obtained, and then recycling the coated film by re-extruding the same with fresh polyester.

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4,391,768

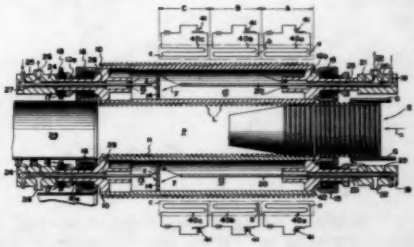
## METHODS AND APPARATUS FOR CURLING LIPS ABOUT THE OPEN MOUTHS OF STACKED THERMOPLASTIC CONTAINERS

Albert W. Arends, and Ronald E. Henke, both of Gladwin, Mich., assignors to Leesona Corporation, Beaverton, Mich.

Filed Mar. 23, 1981, Ser. No. 246,888

Int. Cl.³ B29C 17/00

U.S. Cl. 264—285 14 Claims



1. In rim curling apparatus for curling a turned-in lip about the open mouth of a flexible walled, annular thermoplastic container, formed particularly from difficult to curl materials such as polypropylene, which has a rim which extends radially outwardly and then axially, and which includes a plurality of generally cylindrical elongate, thermally conductive, tubular rotatable rollers, each having a continuous helical groove in its outer peripheral surface, and each being equi-radially spaced

from a common central axis to define therebetween an annular passageway through which a stack of the containers pass with the rim portions of the containers engaged in the grooves of the rollers; means within the rollers, in upstream portions thereof, for heating of the rollers from within and defining an upstream length constituting a rim heating zone; and means within the rollers downstream therefrom, and thermally insulated therefrom, for cooling the rollers from within and defining a downstream length constituting a rim cooling zone; the improvement wherein: the rollers have portions of different diameter; the helical grooves in said upstream portions are of a cross-section to comprise transport sections in reduced diameter portions of the rollers which axially transport the container via their rims without engaging said peripheral side wall portions of the container; external, axially extending, radiant heater means are provided circumferentially between the upstream portions of said rollers to heat the exposed portions of the rims radiantly; the helical grooves in said downstream portions are in portions of said rollers which are of greater diameter than the upstream portions to engage and cool said side wall portions of the container; and helical groove portions of axially decreased width are provided in each roller between the transporting groove portions and the cooling groove portions to form the rims by turning the rims inwardly, the helical groove portion of axially decreased width being in portions of said rollers which are of the same diameter as the portions of the rollers which include the cooling groove portions.

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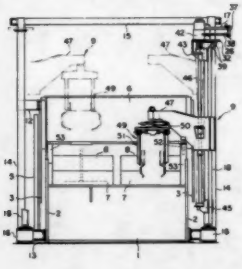
**4,391,769**

## APPARATUS FOR LOADING UNVULCANIZED TIRES ON TIRE VULCANIZING MACHINE

**Katsumi Ichikawa, Akashi; Itaru Amano, Kobe; Keiji Ozaki, Takarazuka, and Seiichi Suzuki, Kodaira, all of Japan, assignors to Bridgestone Tire Co., Ltd. and Kabushiki Kaisha Kobe Seiko Sho, both of Kobe, Japan**

**Filed Jun. 10, 1981, Ser. No. 272,268**
**Claims priority, application Japan, Jun. 14, 1980, 55-81167**
**Int. Cl.³ B29H *5/02***
**U.S. Cl. 264—326** **2 Claims**



2. A method for loading an unvulcanized tire on a tire vulcanizing machine by holding said unvulcanized tire by a contractly expansible paddle, lifting and oscillating said unvulcanized tire over said machine and thereafter descending and placing said unvulcanized tire on a mold of said machine which comprises the steps of:

placing and keeping unvulcanized tires at a plural number of stand-by stations located on a locus of oscillatory movement of said unvulcanized tire, and

picking up a predetermined unvulcanized tire from said stand-by stations.

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**4,391,770**

## PROCESS FOR SPINNING AMINO-FORMALDEHYDE FIBERS

**Graham E. Martin, Middlesbrough, England, assignor to Imperial Chemical Industries PLC, London, England**

**Filed Nov. 17, 1981, Ser. No. 322,291**
**Claims priority, application United Kingdom, Dec. 1, 1980, 8038537**
**Int. Cl.³ B29C *25/00***
**U.S. Cl. 264—236** **8 Claims**

1. A process for the production of fibers from amino-formaldehyde resins in which the fibers are formed from a solution of the resin and cured by heating to a temperature between 100° C. and 300° C., characterised in that the resin solution contains a catalyst mixture comprising 0.2 to 5% by weight, based on the resin solids, of ammonium formate and from 10 to 50% by weight, based on the weight of the ammonium formate, of a salt of a non-volatile acid selected from

(i) an ammonium salt of an acid selected from sulphuric, phosphoric, and nitric acids, and

(ii) a water soluble salt of a metal selected from zinc, magnesium, calcium, and aluminum and an acid selected from nitric, sulphuric, and phosphoric acids.

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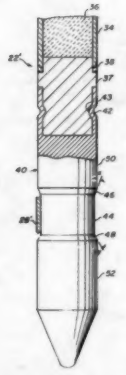
**4,391,771**

## ARRANGEMENT FOR RETAINING A FUEL ROD IN A RECONSTITUTABLE FUEL ASSEMBLY

**Andrew J. Anthony, Tariffville, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Dec. 3, 1980, Ser. No. 212,375**
**Int. Cl.³ G21C *3/10, 3/12***
**U.S. Cl. 376—451** **8 Claims**



1. A nuclear fuel assembly having a horizontal lower end fitting, an elongated frame rigidly connected to the lower end fitting and extending vertically therefrom, the frame including a plurality of longitudinally spaced apart horizontal grids, each grid formed from a plurality of interconnected metal strips defining a multiplicity of openings and having resilient means projecting laterally into each opening, and a multiplicity of longitudinally disposed, parallel fuel rods each passing through an opening in every grid and maintained in vertical and horizontal position by the resilient means, the fuel rods formed of Zircaloy tubes sealed at each end with Zircaloy caps wherein the improvement comprises:

each fuel rod having a generally cylindrical, stainless steel tip mechanically joined to the Zircaloy cap, the tip having an indented retention notch extending between axially spaced, bevelled surfaces for engaging the resilient means on the lowermost grid.

4,391,772

## PROCESS FOR THE PRODUCTION OF SHAPED PARTS FROM POWDERS COMPRISING SPHEROIDAL METAL PARTICLES

Yannick Bonnor; Gerard Raisson, both of Nevers, and Yves Honnorat, Orsay, all of France, assignors to Creusot-Loire, Paris, France

Filed Oct. 31, 1980, Ser. No. 202,825
Claims priority, application France, Nov. 14, 1979, 79 28066
Int. Cl.³ B22F 1/00, 3/00; C22C 1/04
U.S. Cl. 419—23 5 Claims

1. A process for the production of shaped parts from a powder comprising spheroidal metal particles, comprising the successive steps of

(a) mixing said powder with from 0.2% to 2% of lubricant of stearate type;

(b) mixing said powder and said lubricant with from 0.2% to 2% of organic binder of cellulose gum type;

(c) mixing the powder thus obtained with an amount of water of from 0.2% to 2%;

(d) cold compacting the resulting mixture; and

(e) subjecting said mixture to a two-phase sintering operation, in an atmosphere which is neutral or reducing with respect to said mixture, the first phase being effected at a temperature of from 300° to 500° C. and the second phase being effected at a temperature which is substantially higher.

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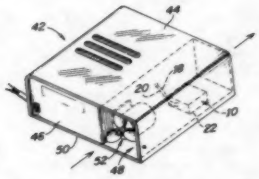
4,391,773

## METHOD OF PURIFYING AIR AND NEGATIVE FIELD GENERATOR

G. Patrick Flanagan, 9989 E. Morrill Way, Tucson, Ariz. 85715

Filed Jun. 8, 1981, Ser. No. 271,132
Int. Cl.³ A61L 2/00
U.S. Cl. 422—22 8 Claims




1. A method of purifying air, comprising the steps of

placing in proximity to said air a capacitor including a pair of electrodes spaced apart by a solid dielectric material, and

applying between said electrodes an A.C. voltage of at least about 5000 volts having a frequency of at least twenty kiloHertz, said voltage being less than the breakdown voltage across said electrodes.

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4,391,774

## AUTOMATIC DEVICE FOR MAKING SAMPLES FOR ANALYSIS

Jean Dupain, Saint Maur, France, assignor to Societe des Ciments Francais, Guerville, France

Filed Jun. 15, 1981, Ser. No. 273,751
Claims priority, application France, Jun. 27, 1980, 80 14302
Int. Cl.³ G01N 35/00
U.S. Cl. 422—63 21 Claims

1. A device for making samples for analysis, comprising:

a furnace,

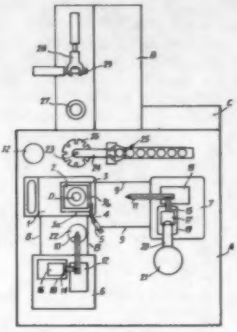
a weighing station,

a plurality of crucibles,

a pair of carriers movable between first and second positions, each of said carriers having means for successively charging one of said crucibles at said station with one of two components of the sample when the carrier is in one of said positions,

means for discarding said one crucible when the weight of one of the components therein differs from a predetermined amount,

means for moving successive ones of a plurality of said crucibles to said station to be charged and to said furnace to melt the contents of the crucible,



a mold adapted to receive the melted contents of the crucible to form the sample,

means for transferring said melted contents to said mold and thereafter discarding the empty crucible, and

control means for activating the means for charging, weighing, emptying and discarding of said crucibles.

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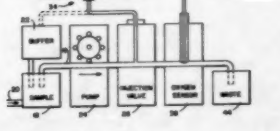
4,391,775

## METHOD OF AND SYSTEM FOR DETERMINING PARTICULAR SPECIES OF CHLORINE IN A WATER SAMPLE

Calvin O. Huber, Mequon; Karl G. Schick, Whitefish Bay, and Joel T. Coburn, Milwaukee, all of Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis. and Electric Power Research Institute, Inc., Palo Alto, Calif.

Division of Ser. No. 200,046, Oct. 23, 1980, Pat. No. 4,322,215.
This application Dec. 7, 1981, Ser. No. 328,015
Int. Cl.³ G01N 27/12, 33/00
U.S. Cl. 422—68 3 Claims




1. A system for determining chlorine species from a group consisting of hypochlorous acid and/or hypochlorite, monochloramine and dichloramine in respective first, second and third samples of a larger supply of water, said system comprising: means for providing each of said samples at a pH within a specific range; first container means including a supply of hydrogen peroxide and second container means including a supply of potassium iodide; means for transferring from said first container means to said first water sample a predetermined amount of hydrogen peroxide such that said first sample is free of potassium iodide whereby said hypochlorous acid and/or hypochlorite if present will react with said hydrogen peroxide

to produce oxygen but said monochloramine and dichloramine if also present will not react with said hydrogen peroxide to produce oxygen; means for transferring from said first container means to said second water sample a predetermined amount of hydrogen peroxide and from said second container means to said second water sample a first predetermined amount of potassium iodide for causing said monochloramine and not said dichloramine to react with said hydrogen peroxide and potassium iodide for producing additional oxygen; means for transferring from said first container means to said third water sample a predetermined amount of hydrogen peroxide and from said second container means to said third water sample a second predetermined amount of potassium iodide for causing said dichloramine to react with said hydrogen peroxide and said potassium iodide for producing still further oxygen; and means for detecting from each of said sample oxygen for indicating whether or not any of said chlorine species are present in said water supply.

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**4,391,776**

## DISSOCIATION CHAMBER AND MEASURING CELL COMBINATION USEFUL FOR MAKING MEASUREMENTS

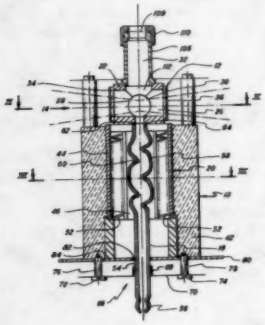
**Klaus Braun, Uberlingen-Bambergen, Fed. Rep. of Germany, assignor to Bodenseewerk Perkin-Elmer & Co. GmbH, Fed. Rep. of Germany**

**Filed Jan. 6, 1981, Ser. No. 223,069**

**Claims priority, application Fed. Rep. of Germany, Jan. 12, 1980, 3001053**

**Int. Cl.³ G01N *21/76***

**U.S. Cl. 422—78** **16 Claims**



1. In combination, a dissociation chamber and measuring cell useful for observing fluorescence radiation, said combination comprising:

a heated dissociation chamber adapted to permit hydrides to be passed therethrough with an inert gas flow, said dissociation chamber including a tubular part surrounded by a jacket-shaped heater, said tubular part having, on the outlet side thereof, a ground surface; and

a measuring cell adjacent said tubular part of said dissociation chamber and located downstream thereof, said cell being adapted for passing an excitation light beam therethrough and for observing fluorescence radiation occurring therein, said measuring cell being a block-shaped body and having three mutually perpendicular bores of which:

the first bore being a through bore communicating on one side thereof with said tubular part of said dissociation chamber and on the other side with an outlet, said first bore having a funnel-shaped ground surface on said one side thereof, said ground surface being complementary to, and engaging with, said ground surface of said tubular part;

the second bore being a through bore closed on both sides thereof by windows whereby an excitation light beam can be passed therethrough;

the third bore being closed by a window through which fluorescence radiation can be observed; and

means, axially resilient and engaged with said tubular part, for retaining said ground surface thereof in resilient engagement with said ground surface of said measuring cell.

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**4,391,777**

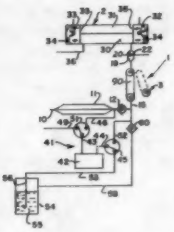
## APPARATUS FOR MEASURING BREATH ALCOHOL

**Donald G. Hutson, El Cerrito, Calif., assignor to Cal Detect, Inc., Richmond, Calif.**

**Filed Jan. 26, 1981, Ser. No. 228,121**

**Int. Cl.³ G01N *1/22, 21/62, 27/04***

**U.S. Cl. 422—84** **1 Claim**



1. Apparatus for analyzing the alcohol content of breath comprising an inlet line; an inlet line check valve in said inlet line; a sample inlet conduit communicating with the output side of said inlet line check valve; an alcohol detector communicating with said sample inlet conduit; a test line communicating at one end with said inlet line on the inlet side of the inlet line check valve and at its other end with a 2-way suction valve in a pump suction line, said inlet valve being selectively movable between a position at which it completes a connection between said test line and said pump suction line and a position at which it completes a connection between said pump suction line and an atmosphere line; an air pump, the suction side of which communicates with said suction line; a pressure line communicating with the pressure side of said pump at one end and with a 2-way pressure valve at the other; said pressure valve being selectively movable between a position at which it communicates with a purge line communicating with the sample inlet conduit and a position at which it communicates with an alcohol standard pressure line; an alcohol standard solution container with a bubbler tube communicating with said alcohol standard pressure line; and an alcohol standard sample line communicating with said alcohol standard solution container at one end and with an inlet side of a sample line check valve at the other; the outlet side of said sample line check valve communicating with the said sample inlet conduit, and said purge line communicating with said sample inlet conduit between the said outlet side of the said sample line check valve and the outlet side of the breath inlet check valve.

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**4,391,778**

## METHOD AND APPARATUS FOR THE ANALYSIS OF MATERIALS BY CHROMATOGRAPHY AND MASS SPECTROMETRY

**Brian D. Andresen, and Kwokei J. Ng, both of Columbus, Ohio, assignors to The Ohio State University, Columbus, Ohio**

**Filed Sep. 30, 1981, Ser. No. 306,942**

**Int. Cl.³ G01N *31/08;* H01J *27/00***

**U.S. Cl. 422—89** **3 Claims**

1. An apparatus for the analysis of materials by temperature-programmed gas chromatography and mass spectrometry, said apparatus comprising:

a gas chromatography column having an outlet;

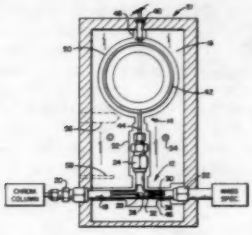
first heating means for progressively increasing the temperature of said column from a lower temperature to an upper temperature;

a mass spectrometer having an inlet;

an open-split interface connecting said outlet of said column to said inlet of said mass spectrometer and;

means of supplying inert gas to said open-interface,

the improvement which comprises second heating means for heating said inert gas and said interface to above said upper temperature, thereby reducing the instrumental drift of the base line signal of the total ionization of said mass spectrometer, said second heating means comprising a heating block having walls defining an interface channel



which accommodates said interface and a gas channel which intersects said interface channel and through which gas can be passed into said interface channel, said heating block being provided with thermostatic control means for maintaining the temperature of said block substantially constant during said progressive increase of temperature of said column, and wherein said means for supplying said inert gas to said open-split interface comprises a gas supply line having its one end connected to said open-split interface, said gas supply line having a helical section disposed within said gas channel, said helical section increasing the residence time of said gas within said gas channel and thereby improving the uniformity of temperature of said gas reaching said open-split interface.

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**4,391,779**

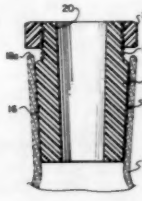
**TEFLON GROUND GLASS ADAPTOR**

**Robert J. Miskinis, 9758 Airport Vista Rd., Santee, Calif. 92071**

**Filed Jul. 6, 1981, Ser. No. 280,361**

**Int. Cl.³ B01L *11/00***

**U.S. Cl. 422—99** **7 Claims**



1. A reusable stopper for tapered ground openings in standard laboratory glassware:

said stopper having a tapered body portion, and a threaded portion extending from the end of the larger cross-sectional area of the body portion and constructed of a substantially rigid synthetic resin polymer material;

said tapered body portion having a surface conforming to the prescribed surface specifications of standard glassware openings to provide a uniformly sealed connection simultaneously throughout their respective surface upon initial contact when seated;

a one-piece retractor nut having a textured outer surface and mounted on the threaded portion of the stopper, said nut dimensioned to engage the rim of the glassware opening and being smaller in length than said threaded portion;

whereby a slight rotation of the nut will engage the rim of the glassware opening to apply an axial force on the seated body portion sufficient to break the seal between said surfaces enabling the stopper to be lifted freely out of the opening.

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**4,391,780**

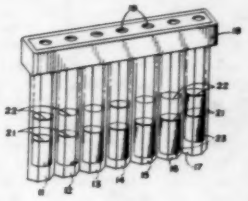
**CONTAINER FOR SAMPLE TESTING**

**Michael J. Boris, Yorba Linda, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.**

**Filed Jul. 6, 1981, Ser. No. 280,766**

**Int. Cl.³ B01L *3/00***

**U.S. Cl. 422—102** **3 Claims**



1. Apparatus for comparative testing of a sample substance comprising:

a unitary structure including a single row of at least four tubularly shaped compartments joined side by side along said single row, each said compartment having the same cross sectional area, each said compartment including an upper open end and a lower closed end spaced from said upper open end graduated distances such that at least three of said compartments define successively increasing or decreasing volumes as measured from the other of said compartments which is a control compartment;

a layer of self sealing elastomeric material placed over said open ends for sealing each said compartment from adjacent compartments and from the outside atmosphere;

a protective layer positioned between said open ends and said elastomeric material;

a cover connectable to said compartments adjacent said open end, said cover and said upper end of said compartments cooperating to position and compress said elastomeric material and said protective layer, said cover including access openings, one access opening for each compartment, each said access opening in line with its corresponding open end such that a probe may be inserted through each said access opening, said elastomeric material, and said protective layer to enter said compartment; and

at least one level line on each said compartment, each said level line being spaced from said open end a predetermined distance such that at least some of said level lines are spaced different distances from said lower closed end.

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**4,391,781**

**ELECTRICALLY HEATED VAPOR DISPENSER**

**Klaas J. van Lit, Amstelveen, Netherlands, assignor to S. C. Johnson & Son, Inc., Racine, Wis.**

**Filed Mar. 22, 1982, Ser. No. 360,866**

**Int. Cl.³ A61L *9/03***

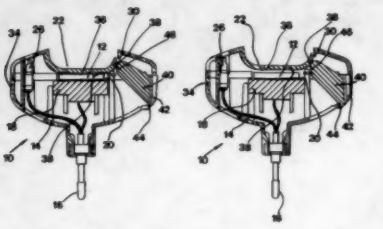
**U.S. Cl. 422—125** **8 Claims**

1. A device for dispensing a thermally volatilizable substance, comprising:

a housing;

a heater secured within the housing and having a heating surface forming a support for a replaceable mat containing the volatilizable substance;

said housing defining a window over the heating surface and an access opening adjacent to one end of the heating surface for removal and/or insertion or replaceable mats;



a clamp arm secured to the housing, extending over the window, and terminating in a free end and having means biasing said clamp arm towards the heating surface to press a mat thereagainst; and

depressible lever secured to the housing and upon depression engageable with the free end of said clamp arm to move the clamp arm away from the heating surface, thereby to release a mat to facilitate removal thereof through said access opening.

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**4,391,782**

## IN SITU URANIUM LEACHING USING HIGH PRESSURE $CO_2/O_2$ SYSTEM TO OVERCOME CHLORIDE ION INHIBITION

**Tsoung-Yuan Yan, Philadelphia, Pa., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Dec. 31, 1980, Ser. No. 221,556**

**Int. Cl.³ C22B *60/02***

**U.S. Cl. 423—7** **14 Claims**

9. An improved process for the in situ recovery of uranium values from a uranium-bearing subterranean formation, having formation fluids with a sufficient chloride concentration to substantially inhibit the leaching rate of the uranium value therein, comprising the steps of:

(a) penetrating the formation with at least one injection well and at least one production well in communication with the injection well;

(b) introducing into the formation an aqueous leaching solution containing an oxidant and carbon dioxide wherein the carbon dioxide is introduced under sufficient pressure to substantially improve the uranium-leaching rate and to give the formation fluids a pH of from about 4.0 to about 5.0;

(c) producing pregnant leaching solution containing uranium values and having a pH of from about 4.0 to about 5.0; and

(d) passing the produced pregnant leaching solution through an ion exchange resin to recover uranium values therefrom.

**4,391,783**

## PROCESS FOR MAKING ABRASION-RESISTANT SODIUM TRIPOLYPHOSPHATE

**Hans Haas, Swisttal-Strassfeld, and Werner Kowalski, Weilerswist-Metternich, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Mar. 8, 1982, Ser. No. 356,023**

**Claims priority, application Fed. Rep. of Germany, Mar. 13, 1981, 3109652**

**Int. Cl.³ C01B *15/16, 25/26***

**U.S. Cl. 423—315** **8 Claims**

1. A process for making granular sodium tripolyphosphate of high abrasion resistance which comprises: spray-drying a sodium orthophosphate solution or suspension containing $Na_2O$ and $P_2O_5$ in essentially the molar ratio required for the sodium tripolyphosphate in a one-stage spray-drying operation by means of a nozzle inside a heated spray tower with the resultant formation of the tripolyphosphate, the orthophosphate solution or suspension being sprayed jointly with a solution of a high molecular weight phosphate of sodium, potassium or ammonium containing between 60 and 73 weight % $P_2O_5$, the proportion of the said solution being 0.005 to 5 weight %, calculated as solid substance and based on the $P_2O_5$-content of the orthophosphate solution or suspension.

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**4,391,784**

## FOAM CONTROL DURING PRODUCTION OF PHOSPHORIC ACID

**Richard N. Hill, Sr., 3412 Polk Ave., and Charles D. B. Hill, 1475 Woodlake Dr., Apt. 182, both of Lakeland, Fla. 33803**

**Filed Aug. 18, 1981, Ser. No. 293,850**

**Int. Cl.³ C01B *25/16***

**U.S. Cl. 423—320** **5 Claims**

1. In the production of phosphoric acid comprising the steps:

(a) digesting ground phosphate rock with sulfuric acid and weak phosphoric acid recycled from Step (d) below to form a slurry comprising strong phosphoric acid and byproduct gypsum, and forming a foam on the surface of the slurry;

(b) passing the slurry to a filtration operation;

(c) separating gypsum from strong phosphoric acid in the said filtration operation thereby forming a gypsum filter cake of gypsum crystals;

(d) washing the gypsum filter cake with wash water thereby forming weak phosphoric acid, and recycling said weak phosphoric acid to the digestion in Step (a); the improvement comprising

(e) removing foam from the slurry surface;

(f) liquifying the removed foam; and

(g) passing the resultant liquid to the filtration operation; whereby the said gypsum crystals are caused to be better suited for filtration, and soluble $P_2O_5$ is returned in the liquified foam.

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**4,391,785**

## PREPARATION OF ZSM-12 TYPE ZEOLITES

**Edward J. Rosinski, Pedricktown, N.J., and Mae K. Rubin, Bala Cynwyd, Pa., assignors to Mobil Oil Corporation, New York, N.Y.**

**Filed Dec. 21, 1981, Ser. No. 332,793**

**Int. Cl.³ C01B *33/28***

**U.S. Cl. 423—329** **6 Claims**

1. In a process for manufacturing synthetic zeolite ZSM-12 which process comprises crystallizing an aqueous forming solution comprising a source of silica and an nitrogenous template and recovering said zeolite ZSM-12, the improvement which comprises utilizing as said nitrogenous template a compound selected from the group consisting of dimethyl pyridinium and dimethyl pyrrolidinium halides.

4,391,786

## PRODUCTION OF CALCIUM CARBIDE

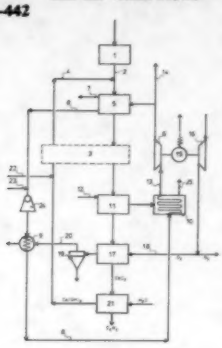
Hans-Joachim Kersting, Frechen; Erhard Wolfrum, Dueren; Willi Portz, and Georg Strauss, both of Erftstadt, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Sep. 14, 1981, Ser. No. 301,836

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1980, 3035026

Int. Cl.³ C01B *31/32*

U.S. Cl. 423—442 6 Claims



1. A process for making calcium carbide by reacting an excess of coke with quicklime in the presence of oxygen in an oxygen-thermal furnace, which comprises: using precrushed coal as a starting material for coke and precrushed lime hydrate ($Ca(OH)_2$) or precrushed limestone ($CaCO_3$) as a starting material for quicklime; mixing the precrushed materials, introducing the resulting mixture into a drying zone and freeing it therein at 80° to 120° C. from adhering water; introducing the warm mixture coming from the drying zone, and air, into a calcining apparatus, the coal constituent being coked and the lime constituent being simultaneously dehydrated or decarbonized therein at temperatures of 900° to 1400° C.; directly delivering the thermally-pretreated mixture of starting materials with an inherent temperature of 900° to 1000° C. to the oxygen-thermal furnace and reacting it with oxygen to produce calcium carbide therein, using the waste heat originating from the calcining apparatus for the generation of superheated high pressure steam from boiler feed water; using the superheated high pressure steam for operating a turbine, the latter being used for the liquefaction of air and separation into its components at low temperature so as to obtain the oxygen necessary for operation of the oxygen-thermal furnace, and also for the generation of electrical power, hot low pressure steam issuing through the turbine's opposite side being introduced at least partially into the drying zone for drying the mixture of starting materials therein; and taking condensate obtained in the drying zone therefrom, preheating it by means of off-gases originating from the oxygen-thermal furnace, and using it as boiler feed water for the generation of superheated high pressure steam by means of waste heat originating from the calcining apparatus.

4,391,787

## METHOD FOR GROWING GRAPHITE FIBERS

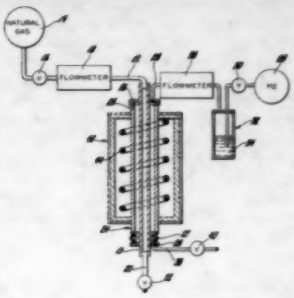
Gary G. Tibbetts, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 170,282, Jul. 18, 1980, abandoned. This application Jul. 9, 1981, Ser. No. 281,864

Int. Cl.³ C01B *31/04;* D01F *9/12*

U.S. Cl. 423—447.3 14 Claims

1. A method for manufacturing graphite fibers by methane pyrolysis, said method comprising contacting gaseous methane to a chromium oxide film on one side of a thin hydrogen-permeable wall, while concurrently dissolving hydrogen into the opposite side, and heating to form graphite fibers on said first wall side.



4,391,788

## STARTING PITCHES FOR CARBON FIBERS

Seiichi Uemura, Tokyo; Shunichi Yamamoto; Takao Hirose, both of Kamakura; Hiroaki Takashima, Kawasaki, and Osamu Kato, Yokohama; all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed Apr. 9, 1982, Ser. No. 366,862

Claims priority, application Japan, Apr. 13, 1981, 56-54307; Jul. 27, 1981, 56-116332

Int. Cl.³ D01F *9/12;* C10C *3/02*

U.S. Cl. 423—447.6 5 Claims

1. A process for making carbon fibers comprising heat treating a starting pitch to make a precursor pitch, melt spinning, infusibilizing, carbonizing or further graphitizing said precursor pitch to obtain carbon fibers wherein the starting pitch is produced by heat treating at 400°–500° C. under a hydrogen pressure of at least 20 $Kg/cm^2.G$ an oil selected from the group consisting of (1) a heavy fraction oil (A) boiling at not lower than 200° C. obtained as a by-product at the time of fluidized catalytic cracking of petroleum and (2) a mixture of said heavy fraction oil (A) with a heavy fraction oil (B) boiling at not lower than 200° C. obtained at the time of steam cracking of petroleum, the ratio by weight between said heavy fraction oil (B) to said heavy fraction oil (A) being 1 to 0.1–9.

4,391,789

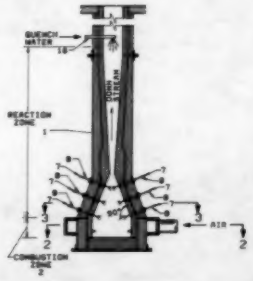
## CARBON BLACK PROCESS

Earl J. Estopinal, Monroe, La., assignor to Columbian Chemicals Company, Tulsa, Okla.

Filed Apr. 15, 1982, Ser. No. 368,534

Int. Cl.³ C01B *31/02;* C09C *1/48*

U.S. Cl. 423—457 3 Claims



1. A method of making a carbon black product comprising: forming, in a first zone of a Venturi type carbon black reac-

tor wherein the first zone is the converging section of the Venturi type carbon black reactor, combustion gases at a high temperature having a gradient of increasing turbulence in an axial downstream direction, said turbulence resulting from the tangential injection of a fuel and a combustion-supporting gas

injecting, substantially radially into the first zone of the reactor, a carbon black feedstock at more than one of the axial gradient positions before the combustion gases reach maximum turbulence,

cracking the carbon black feedstock into carbon black,

quenching the carbon black reaction in a second zone after said gases have reached maximum turbulence, and

collecting the carbon black product said product having a controlled particle size distribution.

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**4,391,790**

## METHOD AND APPARATUS FOR REDUCING THE AMMONIA CONCENTRATION OF SULFUR RECOVERY FACILITY GAS STREAMS

**John W. Palm, and Robert L. Reed, both of Tulsa, Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.**

**Filed Sep. 28, 1981, Ser. No. 306,061**

**Int. Cl.³ C01B *17/02***

**U.S. Cl. 423—574 R** **14 Claims**

1. A process for sulfur recovery comprising:

subjecting a gas stream containing ammonia and hydrogen sulfide to a partial combustion step in a noncatalytic first combustion zone to produce a mixture including hydrogen sulfide, sulfur dioxide, nitrogen, water, and unconverted ammonia;

introducing the thus-produced water mixture into a Claus first catalytic reaction zone in which hydrogen sulfide and sulfur dioxide in the mixture react at a temperature above the dew point of sulfur to produce a hot effluent stream containing free sulfur;

separating the thus-produced free sulfur from the hot effluent stream to produce a tail gas stream;

forming free sulfur by contacting the tail gas stream with a catalyst at a temperature such that the preponderance of free sulfur thus formed is deposited on the catalyst;

simultaneously depositing ammonium compounds on the catalyst;

removing the thus-deposited free sulfur and ammonium compounds from the catalyst by passing a hot regeneration gas in contact with the catalyst to produce a regeneration effluent stream comprising free sulfur and ammonia; and

reducing the concentration of ammonia in at least a portion of the regeneration effluent stream to produce a stream leaner in ammonia, said portion of the regeneration effluent stream being combusted in a noncatalytic combustion zone to produce said stream leaner in ammonia.

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**4,391,791**

## LOW TEMPERATURE SULFUR RECOVERY

**John W. Palm, and Richard Mungen, both of Tulsa, Okla., assignors to Standard Oil Company (Indiana), Chicago, Ill.**

**Continuation of Ser. No. 252,441, Apr. 9, 1981, abandoned. This application Feb. 9, 1982, Ser. No. 347,229**

**Int. Cl.³ C01B *17/02*; F28B *1/02***

**U.S. Cl. 423—574 R** **15 Claims**

1. A process for removing and recovering vaporized elemental sulfur from a gas stream, said process comprising:

(a) passing said gas stream through a first cooling zone maintained at such conditions, including temperature, so as to effect condensation of elemental sulfur without solidification thereof;

(b) passing said gas stream from said first cooling zone through a second cooling zone maintained at such conditions, including temperature, so as to effect solidification of elemental sulfur therein;

(c) interchanging conditions of said first cooling zone and said second cooling zone and directing said gas stream to flow through said second cooling zone first and then through said first cooling zone;

(d) interchanging conditions of said first cooling zone and said second cooling zone and directing said gas stream to flow through said first cooling zone first then through said second cooling zone, said steps (c) and (d) being carried out after at least a significant part of the build-up of elemental sulfur is melted in the zone maintained at condensation conditions but before the build-up in the zone maintained at solidification conditions significantly restricts the flow of said stream.

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**4,391,792**

## METHOD FOR OBTAINING PHOTOSTABLE VALENTINITE AND VALENTINITE THUS OBTAINED

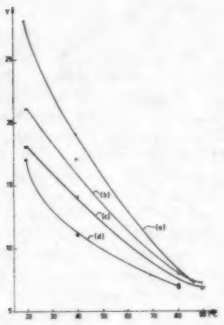
**Rene Bloise, Saint Denis en Val; Marcel Lorang, Orleans; Georges Morizot, Olivet, and Genevieve Boissonnade, Le Pecq, all of France, assignors to Bureau de Recherches Geologiques et Minieres, Paris, France**

**Filed Aug. 12, 1981, Ser. No. 292,054**

**Claims priority, application France, Aug. 12, 1980, 80 17801**

**Int. Cl.³ C01B *29/00***

**U.S. Cl. 423—617** **4 Claims**



1. Process for the production of photostable valentinite by basic hydrolysis of antimony trichloride, characterized in that it consists in effecting the hydrolysis at a temperature between about 80° and about 100° C. with a weight ratio of $H_2O$ to $Sb_2O_3$ equal to or higher than about 10.

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**4,391,793**

## PLANT FOR THERMOCHEMICAL WATER DISSOCIATION BY SOLAR ENERGY

**Friedrich-Karl Boese, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Interatom, Internationale Atomreaktorbau GmbH, Bergisch-Gladbach, Fed. Rep. of Germany**

**Filed Feb. 8, 1980, Ser. No. 119,794**

**Claims priority, application Fed. Rep. of Germany, Feb. 12, 1979, 2905206**

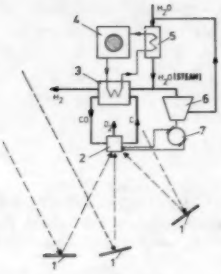
**Int. Cl.³ C01B *1/02***

**U.S. Cl. 423—648 R** **8 Claims**

1. In a method of thermochemically producing hydrogen from water by solar energy, the improvement therein which comprises forming electromagnetic fields containing within an otherwise unenclosed space within a plant a substance thermochemically cleavable into two reaction products at a temperature above 1,100° C., one of said reaction products being reactable in gasifying apparatus with steam to produce hydrogen and the substance, concentrating the solar energy in the unenclosed space, formed by the electromagnetic fields circulating the reaction products from the space to the gasifying appara-

tus, and circulating the substance from the gasifying apparatus to the space.

7. In a plant for thermochemically producing hydrogen from water by solar energy, the improvement therein comprising means for forming electromagnetic fields within an otherwise unenclosed space within the plant, said space being capable of containing a substance thermochemically cleavable into two



reaction products at a temperature above 1,100° C., one of said reaction products being reactable in gasifying apparatus with steam to produce hydrogen and said substance, means for concentrating the solar energy in said space, and means for circulating said reaction products from said space to said gasifying apparatus and for circulating said substance from said gasifying apparatus to said space.

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**4,391,794**

## PROCESS AND APPARATUS FOR HYDROGEN PRODUCTION

**Ludwig Silberring, Wipkingerplatz 7, Zürich, Switzerland**

**PCT No. PCT/CH79/00112, § 371 Date Jul. 21, 1980, § 102(e) Date Jun. 13, 1980, PCT Pub. No. WO80/01065, PCT Pub. Date May 29, 1980**

**PCT Filed Aug. 20, 1979, Ser. No. 200,491**

**Claims priority, application Switzerland, Nov. 21, 1978, 11935/78**

**Int. Cl.³ C01B *1/13***

**U.S. Cl. 423—650** **1 Claim**

1. A process for producing hydrogen under pressure by means of chemical reactions between hydrocarbons and water vapor with a reduced requirement of hydrocarbons and energy, said process comprising the steps of:

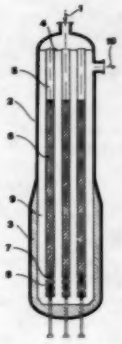
applying to one end of a reaction vessel a feedstock having hydrocarbons and water vapor therein;

conducting the feedstock through a plurality of pipes containing a reaction catalyst; and

heating the feedstock to the reaction temperature and supplying heat necessary for an endothermic reaction, said heating step comprising the steps of:

circulating the products of the endothermic reaction in heat exchange relationship with the pipes within the reaction vessel to recover the sensible heat of the reaction products; and

electrically heating the reacting gases in a portion of the reaction vessel spaced from the one end thereof after said circulating step and after the reaction has begun to complete the endothermic reaction within the reaction vessel and to raise the temperature of the gaseous reac-



tion products to allow the recovery of the sensible heat thereof in said circulating step.

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**4,391,795**

## ASSAY FOR FREE THYROID HORMONE

**Samuel R. Pearlman, Union, N.J., assignor to Becton Dickinson and Company, Paramus, N.J.**

**Filed Mar. 21, 1980, Ser. No. 131,934**

**Int. Cl.³ G01N *33/56, 33/58, 33/60***

**U.S. Cl. 424—1** **16 Claims**

1. A process for determining free thyroid hormone in a serum sample, comprising:

introducing a serum sample containing free thyroid hormone and thyroid hormone bound to serum proteins into a tube coated with a binder for free thyroid hormone, said binder having a number of binding sites in excess of that required to bind all of the free thyroid hormone in the serum sample, said serum sample containing the free and bound thyroid hormone being in contact with said binding sites;

incubating said serum sample in said tube to bind free thyroid hormone to said binder;

removing from the tube the serum sample which is not bound to said coated binder;

thereafter introducing into said tube labelled thyroid hormone in an amount in excess of the remaining binding sites of the coated binder to bind a portion of the labelled thyroid hormone to the coated binder;

removing from the tube unbound labelled thyroid hormone; and

measuring the amount of at least one of the bound and unbound labelled thyroid hormone for determining the amount of free thyroid hormone present in the serum sample.

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4,391,796

## HEPATITIS B TESTING AND GROWTH IN TREE SHREW AS ANIMAL MODEL

Peter Lorenz, Frankfurt am Main, and Anita Schwaier, Eschborn, both of Fed. Rep. of Germany, assignors to Battelle-Institut e.V., Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 182,490, Aug. 29, 1980, Pat. No. 4,355,019. This application Apr. 21, 1982, Ser. No. 370,399

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1979, 2935634

Int. Cl.[3] A61K *39/29, 47/00;* C12Q *1/18, 1/22, 1/70;* G01N *33/54*

U.S. Cl. 424—9 21 Claims

1. Process for the growth and collection of viral hepatitis antigen type B from a tree shrew (*Tupaia belangeri*), which is used as an animal model, comprising:

(a) infecting said tree shrew with viral hepatitis type B;

(b) performing at least one antibody determination at specific intervals over a period of about 60 days after infection of said tree shrew; and

(c) obtaining said viral hepatitis antigen type B from said infected tree shrew.

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4,391,797

## SYSTEMS FOR THE CONTROLLED RELEASE OF MACROMOLECULES

Moses J. Folkman, Brookline, and Robert S. Langer, Jr., Allston, both of Mass., assignors to The Children's Hospital Medical Center, Boston, Mass.

Continuation of Ser. No. 42,788, May 29, 1979, abandoned, which is a continuation-in-part of Ser. No. 756,892, Jan. 5, 1977, Pat. No. 4,164,560. This application Aug. 10, 1981, Ser. No. 291,769

The portion of the term of this patent subsequent to Aug. 14, 1996, has been disclaimed.

Int. Cl.[3] A61K *9/26, 31/74, 37/26*

U.S. Cl. 424—19 20 Claims

1. A therapeutic system for the continuous and controlled administration of macromolecules, said system being in the form of a body which is sized and shaped for placement in the environment of use, comprising a two-phase composition of:

(a) a first phase comprising a biocompatible plastically deformable polymeric matrix having an aqueous fluid sorptivity not greater than 50% by weight, the polymer being insoluble in the environment of use, substantially impermeable to the macromolecule, and containing in admixture therewith;

(b) a second phase comprising from about 3 to 90 parts by weight of an agglomerated, hydrophilic, aqueous fluid-swellable, aqueous fluid dispersible, biologically active macromolecular material of molecular weight of at least 1000;

said macromolecular material forming an interpenetrating phase comprising an agglomerate made of a plurality of clusters of macromolecules that form a network of substantially contiguous particles in the polymeric matrix, and

wherein, when the body is placed in the environment, aqueous fluid will permeate by diffusion into the polymer matrix and be absorbed by the biologically active macromolecular phase, said matrix having channels communicating between the macromolecular particles and the surface of said polymer body, whereby the biologically active macromolecules are continuously released from the matrix over a prolonged period of time.

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4,391,798

## NON-IRRITATING DENTIFRICE

Edward A. Tavss, Kendall Park, and Edward Eigen, East Brunswick, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Mar. 15, 1982, Ser. No. 357,918

Int. Cl.[3] A61K *9/16, 9/18, 7/22*

U.S. Cl. 424—52 10 Claims

1. A substantially non-irritating dentifrice composition of improved flavor comprising an anionic surfactant, and a water soluble positively charged partially hydrolyzed protein having an isoionic point above 7, and a Bloom gel value of zero, selected from the group consisting of a protein hydrolysate fraction containing a high concentration of basic amino acids, and a quaternary derivative of the partially hydrolyzed protein, in a dental vehicle.

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4,391,799

## PROTECTIVE GEL COMPOSITION FOR TREATING WHITE PHOSPHORUS BURN WOUNDS

Arthur D. Mason, Jr.; Avery A. Johnson, Jr., both of San Antonio, Tex., and Charles R. Ritchey, Stillwater, Okla., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation of Ser. No. 121,870, Feb. 15, 1980, abandoned. This application Oct. 30, 1981, Ser. No. 316,575

Int. Cl.[3] A61K *33/38*

U.S. Cl. 424—132 4 Claims

1. A method for treating white phosphorus burn wounds which comprises applying over the wound surface a coating of an aqueous gel composition comprising 0.01 to 1% by weight of a water-soluble silver or copper salt selected from the group consisting of silver nitrate, silver acetate, silver lactate monohydrate and copper sulfate pentahydrate which will dissolve in water at a minimum concentration of 0.1% by weight of the water in the gel and as a matrix therefor, a water-soluble hydrogel consisting essentially of about 0.5 to 3% by weight alkali metal alginate, about 8 to 12% by weight glycerin and about 82 to 90% by weight water wherein the hydrogel has a pH in the range of 6.8 to 7.2 and which upon drying forms a flexible, stretchable, transparent, water-soluble protective film, non-toxic and adherent to a white phosphorus burn wound surface to which gel composition is applied, and which allows for encapsulation and removal of vivid darkened white phosphorus particles.

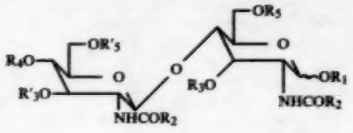
**4,391,800**

## IMMUNOLOGICALLY ACTIVE PEPTIDYL DISACCHARIDES AND METHODS OF PREPARATION

**Philippe L. Durette, New Providence, and Tsung-Ying Shen, Westfield, both of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Apr. 27, 1979, Ser. No. 33,597**
**Int. Cl.³ A61K** *37/00*; **C07C** *103/52*
**U.S. Cl. 424—177** **13 Claims**

**1.** A 2-amino-2-deoxy-β-D-glucopyranosyl-(1→4)-2-amino-2-deoxy-D-glucose of the general structural formula:

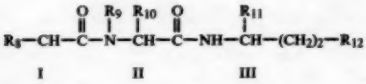


wherein

$R_1$ is hydrogen, alkyl (1–7C), substituted alkyl (1–7C) wherein the substituent is hydroxy, mercapto, alkoxy of 1–3 carbons, alkyl mercapto of 1–3 carbons, hydroxy or mercapto esterified by an acid of 1–4 carbon atoms, F, Cl, Br, carboxyl, or carboxyl functionally modified by esterification with an alcohol of 1–3 carbons or by amidation, phenyl, substituted phenyl wherein the substituent is an alkyl group of 1–3 carbons, hydroxy, mercapto, hydroxy or mercapto etherified by an alkyl group of 1–3 carbons, hydroxy or mercapto esterified by an acid of 1–4 carbons, alkyldioxy (1–4C), cycloalkyldioxy (5–7C), amino or trifluoromethyl, benzyl, or substituted benzyl wherein the substituent is an alkyl group of 1–3 carbons, hydroxy, mercapto, hydroxy or mercapto etherified by an alkyl group of 1–3 carbon atoms, hydroxy or mercapto esterified by an acid of 1–4 carbons, alkyldioxy (1–4C), cycloalkyldioxy (5–7C), amino or trifluoromethyl;

$R_2$ is alkyl (1–7C), substituted alkyl (1–7C) wherein the substituent is hydroxy, mercapto, alkoxy of 1–3 carbons, alkylmercapto of 1–3 carbons, hydroxy or mercapto esterified by an acid of 1–4 carbon atoms, F, Cl, Br, carboxyl, or carboxyl functionally modified by esterification with an alcohol of 1–3 carbons or by amidation, phenyl, or substituted phenyl wherein the substituent is an alkyl group of 1–3 carbons, hydroxy, mercapto, hydroxy or mercapto etherified by an alkyl group of 1–3 carbon atoms, hydroxy or mercapto esterified by an acid of 1–4 carbons, alkyldioxy (1–4C), cycloalkyldioxy (5–7C), amino or trifluoromethyl and each $R_2$ may be the same group or a different group;

$R_3$ and $R'_3$ are H or



I II III

wherein

$R_8$ is H or lower alkyl (1–10C), and provided at least one of $R_3$ and $R'_3$ is not H;

$R_9$ is H, or $R_9$-$R_{10}$ together is $—CH_2CH_2CH_2—$;

$R_{10}$ is H, alkyl (1–7C) hydroxymethyl, mercaptomethyl, benzyl, or substituted benzyl wherein the substituent is an alkyl group of 1–3 carbon atoms, hydroxy, mercapto, hydroxy or mercapto etherified by an alkyl group of 1–3 carbons, hydroxy or mercapto esterified by an acid of 1–4 carbons, alkyldioxy (1–4C), cycloalkyldioxy (5–7C), amino or trifluoromethyl;

$R_{11}$ and $R_{12}$ each are independently carboxyl, esterified carboxyl (1–7C), amidated carboxyl, or mono- or di-alkyl (1–7C) amidated carboxyl;

$R_4$, $R_5$ and $R'_5$ are the same or different and are H, aliphatic or aromatic acyl (2–21C) or substituted acyl (2–21C) wherein the substituent is halogen, alkyl (1–3C), alkoxy (1–3C), trifluoromethyl, hydroxy, alkanoyloxy (1–3C),

provided when $R_8$ is loweralkyl, the stereo chemistry at asymmetric center I can be either D or L; and when $R_{10}$ is not H, the stereochemistry at asymmetric center II is L; the stereochemistry at asymmetric center III is D;

provided further when $R_1$, $R_5$, $R'_3$, $R_4$, and $R'_5$ are each H and each $R_2$ is $CH_3$, $R_3$ is not $H_3CCHCOR_{13}$ wherein $R_{13}$ is a dipeptide.

**10.** A composition having immunostimulatory properties comprising a compound of claim **1** in an amount effective to produce an immunostimulatory effect and a pharmaceutically acceptable carrier.

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**4,391,801**

## PLASMA PROTEIN FRACTION SUBSTANTIALLY FREE OF ACETATE IONS

**Paul K. Ng, Hercules, and Michael A. Fournel, Castro Valley, both of Calif., assignors to Cutter Laboratories, Inc., Berkeley, Calif.**

**Filed Oct. 29, 1981, Ser. No. 316,201**
**Int. Cl.³ A61K** *37/02*, *37/04*
**U.S. Cl. 424—177** **17 Claims**

**1.** A stable human plasma protein fraction precipitated from Supernatant IV-1 of the Cohn fractionation scheme as described in U.S. Pat. No. 2,958,628 wherein the plasma protein fraction consists essentially of at least eighty three percent albumin and no more than seventeen percent alpha and beta globulin and wherein the acetate ion concentration is about that ordinarily found in human blood plasma.

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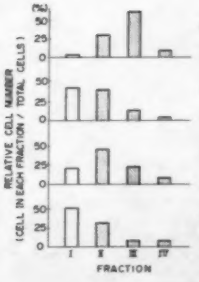
**4,391,802**

## METHOD OF TREATING LEUKEMIA OR LEUKEMOID DISEASES

**Tatsuo Suda, Tachikawa; Yoshibei Hirasawa; Sachio Takahashi, both of Niigata; Etsuko Abe; Kunio Kouno, both of Tokyo, and Tadao Aoki, Niigata, all of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 9, 1982, Ser. No. 356,385**
**Claims priority, application Japan, Mar. 13, 1981, 56-35218**
**Int. Cl.³ A01N** *45/00*; **A61K** *31/59*
**U.S. Cl. 424—236** **8 Claims**




**1.** A method for the treatment of leukemia or leukemoid diseases, comprising administering to a patient having such a disease an effective amount of a vitamin D derivative with a hydroxyl group at the 1α-position.

**2.** A method according to claim **1** wherein said derivative is administered in a soft capsule.

## 4,391,803
## ADRENOSTERIOD COMPOSITION AND METHOD FOR THE TREATMENT OF SHOCK BY INFUSIONAL THERAPY

**Fernando F. Fussi, Fribourg, Switzerland, assignor to Hepar Industries, Franklin, Ohio**

**Continuation-in-part of Ser. No. 365,867, Apr. 5, 1982, abandoned. This application May 6, 1982, Ser. No. 375,749**

**Int. Cl.³ A61K** *31/56*

**U.S. Cl. 424—239** **11 Claims**

1. A pharmaceutical composition consisting essentially, in percent by weight, of the following adrenosteroids:

| | | |
|---|---|---|
| 1. | 11-Dehydrocorticosterone | 10.0 ± 1.5 |
| 2. | Corticosterone | 18.5 ± 2.5 |
| 3. | 11-Deoxy-17-hydroxycorticosterone | 3.0 ± 0.5 |
| 4. | Cortisone | 14.0 ± 2.0 |
| 5. | Hydrocortisone | 23.0 ± 3.5 |
| 6. | 4-Pregnene-5 and/or 20,21-diol or triol-3,11-dione | 2.0 ± 0.5 |
| 7. | 4-Pregnene-5,17α,20β,21-triol or tetrol-3,11-dione | 2.0 ± 0.5 |
| 8. | 4-Pregnene-5,11β,17α,20β,21-tetrol-3-one | 3.0 ± 0.5 |
| 9. | 3α or β,21-Dihydroxy-5α or β-pregnane-11,20-dione | 2.5 ± 0.5 |
| 10. | 3α or β,11β,21-Trihydroxy-5α or β-pregnan-20-one | 3.0 ± 0.5 |
| 11. | 3α or β,17,21-Trihydroxy-5α or β-pregnan-20-one | 2.5 ± 0.5 |
| 12. | 3α or β,17,21-Trihydroxy-5α or β-pregnane-11,20-dione | 2.4 ± 0.5 |
| 13. | 3α or β,17,21-Tetrahydroxy-20-oxo-5α or β-pregnane | 2.5 ± 0.5 |
| 14. | Allopregnane-3β,17α,20β-21-tetrol | 2.0 ± 0.5 |
| 15. | Allopregnane-3β,11β,17α,20β,21-pentol | 2.0 ± 0.5 |
| 16. | Deoxycorticosterone | 3.0 ± 0.5 |
| 17. | 18-Hydroxy-deoxycorticosterone | 1.5 ± 0.3 |
| 18. | Aldosterone | 3.0 ± 0.5 |

together with a pharmaceutically acceptable carrier or diluent.

## 4,391,804
## IMIDAZOLE DERIVATIVES AND FUNGICIDAL COMPOSITION CONTAINING THE SAME

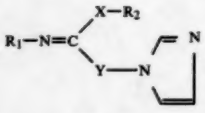
**Hiroshi Ohyama, Chigasaki; Ken Morita, Hiratsuka; Takuo Wada, Hatano, and Masahiko Miyahara, Atsugi, all of Japan, assignors to Hokko Chemical Industry Company, Ltd., Japan**

**Filed Mar. 16, 1982, Ser. No. 358,533**

**Int. Cl.³ A01N** *55/02, 43/50;* **C07D** *233/61*

**U.S. Cl. 424—245** **9 Claims**

1. An imidazole derivative of the general formula



[I]

wherein

$R_1$ is naphthyl group, an arylalkyl group, a cycloalkyl group, a cycloalkylalkyl group, an alkyl group, a lower alkenyl group, a lower alkoxy-lower alkyl group, a phenylthio-lower alkyl group or phenyl group; the phenyl group being unsubstituted or substituted with 1 to 5 substituents which is or are the same or different from each other and selected from a halogen atom, nitro group, cyano group, a lower alkyl group, a lower alkenyl group, a halogenated lower alkyl group, a lower alkoxyl group, a lower alkenyloxy group, a lower alkylthio group, a lower alkylsulfinyl group, a lower alkylsulfonyl group, a lower alkylcarbonyl group, phenyl group, phenoxy group, a halogen-substituted phenoxy group, phenylthio group, a lower alkyl-substituted phenylthio group and a nitro-substituted phenylthio group; $R_2$ is a saturated alkyl group, an unsaturated alkyl group, a lower alkoxy-lower alkyl group, a lower alkylthio-lower alkyl group, a phenoxy-lower alkyl group, a phenylthio-lower alkyl group, a mono- or di-lower alkylamino-lower alkyl group, a lower alkyl group substituted with a group $—N(CH_2)_n$ where n is an integer of 2 to 6, a lower alkylcarbonyl group, phenylcarbonyl group, a cycloalkyl group, a cycloalkylalkyl group, a halogenated lower alkyl group, a cyano-lower alkyl group, a lower alkoxycarbonyl-lower alkyl group, a lower alkylthiocarbonyl-lower alkyl group, an arylalkyl group, a lower alkylcarbonyl-lower alkyl group, a phenylcarbonyl-lower alkyl group, naphthyl group, furfuryl group or phenyl group; the latter phenyl group being unsubstituted or substituted with a substitutent which is selected from a halogen atom, nitro group, cyano group and a lower alkyl group;

X is an oxygen atom or a sulfur atom; and

Y is a straight or branched saturated alkylene group or unsaturated alkylene group, the saturated alkylene group being unsubstituted or substituted with a halogen group, a lower alkoxyl group, cyano group, phenyl group, a halogen-substituted phenyl group, a nitro-substituted phenyl group, a lower alkyl-substituted phenyl group and/or trifluoromethyl-substituted phenyl group, and a salt of said imidazole derivative.

8. A fungicidal composition comprising as the active ingredient a fungicidally effective amount of an imidazole derivative as defined in claim 1, or a salt thereof, in association with an acceptable carrier for the active ingredient.

## 4,391,805
## 1-(1,3-DIOXOLAN-2-YLMETHYL)-AZOLES, THEIR SALTS AND THEIR USE

**Ernst Blume, Bad Soden am Taunus; Wolfgang Schaper, Frankfurt am Main; Wolfgang Raether, Dreieich, and Walter Dittmar, Hofheim am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

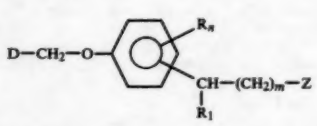
**Filed Oct. 14, 1981, Ser. No. 311,184**

**Claims priority, application Fed. Rep. of Germany, Oct. 16, 1980, 3039087**

**Int. Cl.³ A61K** *31/415;* **C07D** *405/06*

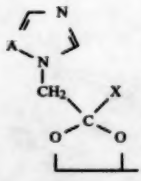
**U.S. Cl. 424—246** **13 Claims**

1. A 1-(1,3-dioxolan-2-ylmethyl)-azole of the formula (I)



(I)

and its stereoisomers and its salts with a physiologically acceptable acid, in which D denotes a 1-(1,3-dioxolan-2-ylmethyl)-azole radical of the following structure



(D)

in which A denotes nitrogen or methine and X denotes naphthyl, thienyl, halogenothienyl or a phenyl group optionally carrying 1, 2 or 3 substituents, the substituents being identical or different and denoting halogen, trifluoromethyl, $C_1$–$C_4$ alkyl or $C_1$–$C_4$ alkoxy, and, in formula (I) further, the $R_n$'s,

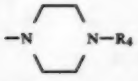
independently of one another, denote halogen, trifluoromethyl, $C_1$–$C_8$ alkyl, $C_1$–$C_4$ alkoxy, $C_3$–$C_5$ alkenyl, $C_1$–$C_4$ alkoxycarbonyl, carboxyl, di-($C_1$–$C_4$)alkylaminomethyl or nitro, n is 0, 1, 2 or 3, or, in the event that n is 2, $R_n$ denotes a $C_4H_4$ radical which, together with the phenyl ring, forms a naphthyl ring, or, in the event that n is 1, $R_n$ represents a phenoxy group optionally carrying 1 or 2 substituents, the substituents being identical or different and denoting halogen, trifluoromethyl, $C_1$–$C_4$ alkyl, or $C_1$–$C_4$ alkoxy, $R_1$ denotes hydrogen, $C_1$–$C_4$ alkyl or a phenyl group optionally carrying 1 or 2 substituents, the substituents being identical or different and denoting halogen, trifluoromethyl, nitro, $C_1$–$C_4$ alkyl or $C_1$–$C_4$ alkoxy, m denotes 0, 1 or 2, and Z denotes either

(a) an amino radical of the formula Z(a)

Z(a)

in which $R_2$ and $R_3$ are identical or different and each denotes hydrogen, $C_1$–$C_8$ alkyl, $C_3$–$C_5$ alkenyl, $C_3$–$C_8$ cycloalkyl or a phenyl or benzyl group optionally carrying 1, 2 or 3 substituents, the substituents being identical or different and each denoting halogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy or trifluoromethyl, or one of the two radicals $R_2$ or $R_3$ denotes $C_1$–$C_5$ alkanoyl or $C_1$–$C_4$ alkoxycarbonyl, or

(b) a radical of the formula Z(b)



Z(b)

in which $R_4$ denotes hydrogen, $C_1$–$C_4$ alkyl, $C_3$–$C_5$ alkenyl, hydroxy-($C_2$–$C_3$)-alkyl, $C_1$–$C_4$-alkoxy-($C_2$–$C_3$)-alkyl, $C_1$–$C_5$ alkanoyl, $C_2$–$C_5$ alkanoylmethyl, $C_1$–$C_4$ alkylsulfonyl, $C_1$–$C_4$ alkyloxycarbonyl, $C_1$–$C_4$ alkyloxycarbonylmethyl, mono-($C_1$–$C_4$)-alkylaminocarbonylmethyl, di-($C_1$–$C_4$)-alkylaminocarbonylmethyl, aminocarbonylmethyl-, mono-($C_1$–$C_4$)alkylaminocarbonyl, di-($C_1$–$C_4$)-alkylaminocarbonyl, $C_1$–$C_4$-alkylaminothiocarbonyl, $C_1$–$C_4$-alkylthiothiocarbonyl, aminocarbonyl, $C_3$–$C_5$-alkenylaminocarbonyl, or $C_3$–$C_5$-alkenylaminothiocarbonyl, or $R_4$ denotes a phenyl, phenylmethyl, phenylaminocarbonyl or benzoyl group, each of the phenyl groups optionally carring 1 or 2 substituents which are identical or different and denote halogen, trifluoromethyl, $C_1$–$C_4$-alkyl, or $C_1$–$C_4$-alkoxy, or

(c) a 1-H-imidazol-1-yl, 1H-1,2,4-triazol-1-yl, pyrazol-1-yl-, pyrrolidin-1-yl-, piperidin-1-yl-, morpholin-4-yl, thiomorpholin-4-yl, 2,6-dimethylmorpholin-4-yl, 2,6-dimethylthiomorpholin-4-yl, 1,2,3,4-tetrahydroquinolin-1-yl or 1,2,3,4-tetrahydroisoquinolin-2-yl radical, or

(d) an isocyano group of the formula Z(d)

Z(d)

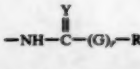
or

(e) an isothiocyano group of the formula Z(e)

Z(e)

or

(f) a radical of the general formula Z(f)



Z(f)

in which Y represents oxygen or sulfur, G represents oxygen or an NH group, r represents 0 or 1 and $R_5$ represents hydrogen, $C_1$–$C_4$-alkyl, monohalogenomethyl, dihalogenomethyl, trihalogenomethyl or a phenyl group optionally carrying 1 or 2 substituents, the substituents being identical or different and each denoting halogen, trifluoromethyl, $C_1$–$C_4$ alkyl, or $C_1$–$C_4$ alkoxy, subject to the proviso that, in the event that Y represents a sulfur atom, G denotes an NH group and r denotes the number 1, that, in the event that G represents an oxygen atom and r represents the number 1, $R_5$ does not denote hydrogen, and that, in the event that $R_5$ represents monohalogenomethyl, dihalogenomethyl or trihalogenomethyl, r denotes 0 and Y denotes oxygen.

13. Method of treating patients suffering from mycoses, protozoa, Gram-positive or Gram-negative bacteria by administering an effective amount of a compound of formula I as claimed in claim 1.

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**4,391,806**

## SUBSTITUTED TETRAHYDROPYRIDAZINO-(1,6-A)BENZIMIDAZOLES AND USE AS BRONCHODILATORS

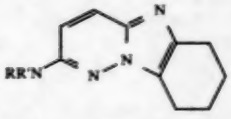
**Catherine A. Alexander, Indianapolis; Robert J. Cregge, Zionsville, and Norton P. Peet, Indianapolis, all of Ind., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Jul. 12, 1982, Ser. No. 397,300**

**Int. Cl.³ A61K** *31/535, 31/50;* **C07D** *487/04*

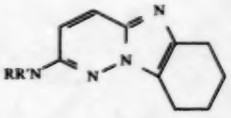
**U.S. Cl. 424—248.4** **5 Claims**

1. A compound of the formula:



wherein —NRR′ is (lower alkyl)amino, di(lower alkyl)amino, 1-pyrrolidinyl, 1-piperidinyl, methyl-1-piperidinyl, hexahydroazepin-1-yl, 4-methyl-1-piperazinyl, 4-methylhexahydro-1,4-diazepin-1-yl and 4-morpholinyl; and the pharmaceutically acceptable acid addition salts of said compound.

5. A method of producing bronchodilation which comprises administering to a mammal in need thereof an effective amount of a compound of the formula



wherein —NRR′ is (lower alkyl)amino, di(lower alkyl)amino, 1-pyrrolidinyl, 1-piperidinyl, methyl-1-piperidinyl, hexahydroazepin-1-yl, 4-methyl-1-piperazinyl, 4-methylhexahydro-1,4-diazepin-1-yl and 4-morpholinyl; and the pharmaceutically acceptable acid addition salts of said compound.

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**4,391,807**

## 6-SUBSTITUTED TETRAHYDROIMIDAZO[2,1-a]PHTHALAZINES AND USE AS BRONCHODILATORS

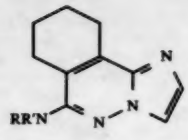
**Catherine A. Alexander, Indianapolis; Robert J. Cregge, Zionsville, and Norton P. Peet, Indianapolis, all of Ind., assignors to The Dow Chemical Company, Midland, Mich.**

**Filed Jul. 12, 1982, Ser. No. 397,301**

**Int. Cl.³ A61K** *31/535, 31/50;* **C07D** *487/04*

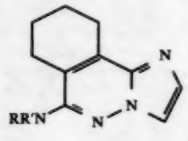
**U.S. Cl. 424—248.4** **5 Claims**

1. A compound of the formula:



wherein —NRR′ is (lower alkyl)amino, di(lower alkyl)-amino, 1-pyrrolidinyl, 1-piperidinyl, methyl-1-piperidinyl, hexahydroazepin-1-yl, 4-methyl-1-piperazinyl, 4-methylhexahydro-1,4-diazepin-1-yl and 4-morpholinyl; and the pharmaceutically acceptable acid addition salts of said compound.

5. A method of producing bronchodilation which comprises administering to a mammal in need thereof an effective amount of a compound of the formula



wherein —NRR′ is (lower alkyl)amino, di(lower alkyl)-amino, 1-pyrrolidinyl, 1-piperidinyl, methyl-1-piperidinyl, hexahydroazepin-1-yl, 4-methyl-1-piperazinyl, 4-methylhexahydro-1,4-diazepin-1-yl and 4-morpholinyl; and the pharmaceutically acceptable acid addition salts of said compound.

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**4,391,808**

## 5(1-PIPERAZINYL(IMIDAZO[2,1-b][1,3,5]BENZOTHIADIAZEPINES

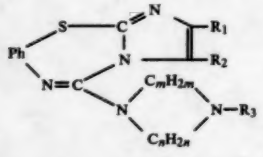
**Isidoros Vlattas, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Continuation-in-part of Ser. No. 158,671, Jun. 12, 1980, abandoned. This application May 11, 1981, Ser. No. 259,261**

**Int. Cl.³ A61K** *31/55;* **C07D** *513/04*

**U.S. Cl. 424—250** **11 Claims**

1. A 5-diazacycloalkyl-imidazo[2,1-b][1,3,5]benzothidiazepine compound of the formula



wherein one of $R_1$ and $R_2$ is hydrogen, lower alkyl or alkanoyl, halogeno, cyano, carboxy, lower carbalkoxy, carboamoyl, sulfamoyl, mono- or di-lower alkyl-(carbamoyl or sulfamoyl), and the other of $R_1$ and $R_2$ is hydrogen, lower alkyl or halogeno; Ph is 1,2-phenylene, unsubstituted or substituted by on member selected from lower alkyl, lower alkoxy, lower alkylthio, halogeno, trifluoromethyl, sulfamoyl, mono- or di-lower alkyl-sulfamoyl, each of $C_mH_{2m}$ and $C_nH_{2n}$ is lower alkylene separating both nitrogen atoms by 2 carbon atoms; and $R_3$ is hydrogen, lower alkyl, lower alkanoyl, lower alkoxycarbonyl, or lower hydroxyalkyl wherein the hydroxy group is separated from the nitrogen atom by at least 2 carbon atoms; the S-oxides; the N-oxides; or a pharmaceutically acceptable salt thereof.

**4,391,809**

## METHODS FOR TREATING PSORIASIS

**Edward F. Elslager, Ann Arbor, Mich., assignor to Warner-Lambert Company, Ann Arbor, Mich.**

**Continuation of Ser. No. 84,944, Oct. 15, 1979, abandoned. This application Nov. 13, 1980, Ser. No. 206,596**

**Int. Cl.³ A61K** *31/505*

**U.S. Cl. 424—251** **5 Claims**

1. A method for treating psoriasis in mammals which comprises administering an antipsoriatic-effective amount of 2,4-diamino-5-methyl-6-[(3,4,5-trimethoxyanilino)methyl]quinazoline, 2,4-diamino-5-chloro-6-[(3,4-dichloroanilino)methyl]-quinazoline or a pharmaceutically acceptable salt thereof, to a mammal in need of said treatment.

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**4,391,810**

## 2-METHYL-4-N,N-DIMETHYLCARBAMOYLOXY-6-AMINO-PYRIMIDINES AND SALTS THEREOF, PROCESSES FOR PRODUCING THEM, AND THEIR USE FOR COMBATING PESTS

**Karl Hoegerle; Laurenz Gsell, both of Basel, and Rudolf Wehrli, Rheinfelden, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.**

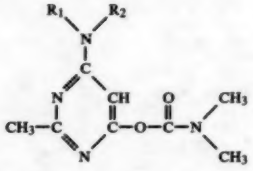
**Filed Dec. 30, 1981, Ser. No. 335,936**

**Claims priority, application Switzerland, Jan. 6, 1981, 31/81; Oct. 14, 1981, 6571/81**

**Int. Cl.³ C07D** *239/47;* **A01N** *9/22*

**U.S. Cl. 424—251** **9 Claims**

1. A compound of the formula:



wherein each of $R_1$ and $R_2$, when taken independently, is hydrogen, alkyl of 1 to 5 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, alkenyl of 2 to 5 carbon atoms, or alkynyl of 2 to 5 carbon atoms, or $R_1$ and $R_2$ taken together are alkylene of 2 to 5 carbon atoms.

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**4,391,811**

## 2-AMINO-6-(PYRIDINYL)-3H-IMIDAZO[4,5-b]PYRIDINES AND THEIR CARDIOTONIC USE

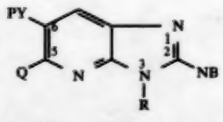
**George Y. Lesher; Chester J. Opalka, Jr., both of Schodack, and Donald F. Page, East Greenbush, all of N.Y., assignors to Sterling Drug Inc., New York, N.Y.**

**Filed Oct. 2, 1981, Ser. No. 307,777**

**Int. Cl.³ C07D** *487/04;* **A61K** *31/44*

**U.S. Cl. 424—263** **10 Claims**

1. A 2-(NB)-3-R-6-PY-5-Q-3H-imidazo[4,5-b]pyridine having the formula



where Q is hydrogen or lower-alkyl, R is lower-alkyl, NB is amino or dimethylamino, and PY is 4- or 3-pyridinyl or 4- or 3-pyridinyl having one or two lower-alkyl substituents, or acid-addition salt thereof.

8. The method for increasing cardiac contractility in a patient requiring such treatment which comprises administering

orally or parenterally in a solid or liquid dosage form to such patient a cardiotonically effective amount of 2-(NB)-3-R-6-PY-5-Q-3H-imidazo[4,5-b]pyridine or pharmaceutically acceptable acid-addition salt thereof, where Q is hydrogen or lower-alkyl, R is lower-alkyl, NB is amino or dimethylamino, and PY is 4- or 3-pyridinyl or 4- or 3-pyridinyl having one or two lower-alkyl substituents.

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## 4,391,812
## 2-(SUBSTITUTEDPIPERIDYLMETHYL) PROPANE NITRILES AND COMPOSITIONS THEREOF

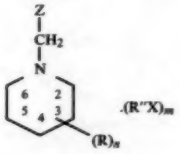
**Richard A. Dybas, Piscataway; Nathaniel Grier, Englewood, and Bruce E. Witzel, Westfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Division of Ser. No. 228,520, Jan. 26, 1981, Pat. No. 4,342,873, which is a division of Ser. No. 8,985, Feb. 5, 1979, Pat. No. 4,247,700, which is a continuation-in-part of Ser. No. 795,693, May 11, 1977, abandoned. This application Mar. 24, 1982, Ser. No. 361,233**

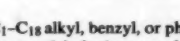
**Int. Cl.³ C07D *211/40***

**U.S. Cl. 424—267** **5 Claims**

1. A compound of the formula:



where Z is



R'' is hydrogen, $C_1$–$C_{18}$ alkyl, benzyl, or phenethyl; R is in the 2-, 3-, or 4-positions and is hydroxy or hydroxyalkyl; R' is amino, loweralkylamino, or diloweralkylamino; n is an integer from 1 to 4; m is the integer 0 or at least 1; and X is a suitably charged anion.

5. A composition containing an antiinflammatory amount of a compound according to claim 1 along with a suitable pharmaceutical carrier.

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## 4,391,813
## VAPOR PHASE FUNGICIDAL METHOD

**Michael Szkolnik, Geneva, N.Y., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.**

**Filed Apr. 17, 1981, Ser. No. 257,039**

**Int. Cl.³ A01N *43/48***

**U.S. Cl. 424—269** **7 Claims**

1. A method of protecting plants from fungal attack or reducing the severity of fungal attach which comprises positioning a substrate coated or impregnated with 1-[[2-(2,4-dichlorophenyl)-4-ethyl-1,3-dioxolan-2-yl]methyl]-1H-1,2,4-triazole in an amount and in a manner such that vapors of said triazole cause said protection from or reduction of fungal activity on the plants.

## 4,391,814
## DERIVATIVES OF ANTIPHLOGISTICALLY EFFECTIVE CARBOXYLIC ACIDS, THEIR PREPARATION AND MEDICINAL USE

**Helmut Vorbrüggen, Berlin, Fed. Rep. of Germany, assignor to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany**

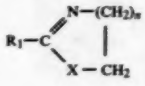
**Filed Dec. 23, 1981, Ser. No. 334,023**

**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1980, 3049405**

**Int. Cl.³ A01N *43/76, 43/80, 43/54, 43/50***

**U.S. Cl. 424—272** **8 Claims**

1. A compound of the formula

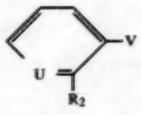


wherein

n is 1;

X is oxygen; and

$R_1$ is of the formula:



(a)

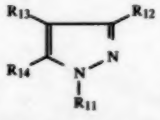
wherein

$R_2$ is (i) alkanoyl or alkanoyloxy each of 2–6 carbon atoms; (ii) phenoxy, anilino or 1-naphthylamino; or (iii) phenoxy, anilino or 1-naphthylamino, each of which is mono- or di-substituted by halogen, trifluoromethyl, or alkyl of 1–4 carbon atoms;

U is —CH═ and

V is a carbon-to-carbon bond or methylene;

or



(b)

wherein

$R_{11}$ is alkyl of up to 6 carbon atoms, phenyl or phenyl mono- or di-substituted by chlorine or fluorine;

one of $R_{12}$, $R_{13}$, and $R_{14}$ is methylenyl; one or two of $R_{12}$, $R_{13}$, and $R_{14}$ is phenyl or phenyl mono- or di-substituted by chlorine or fluorine; or one of $R_{12}$, $R_{13}$, and $R_{14}$ is hydrogen.

**4,391,815**

## CYANOBENZANO[B]PYRANS

**John M. Evans, Royden, England, assignor to Beecham Group Limited, England**

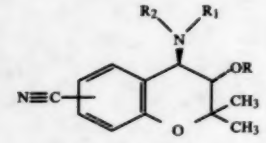
**Continuation-in-part of Ser. No. 79,560, Sep. 27, 1979, abandoned, and Ser. No. 117,261, Jan. 31, 1980, abandoned, which is a division of Ser. No. 970,199, Dec. 18, 1978, Pat. No. 4,251,537, which is a continuation of Ser. No. 776,976, Mar. 14, 1977, abandoned. This application Oct. 17, 1980, Ser. No. 198,280**

**Claims priority, application United Kingdom, Apr. 2, 1976, 13536/76; Apr. 10, 1976, 33178/76; Oct. 4, 1978, 39303/78; Oct. 20, 1978, 41306/78; Jan. 10, 1979, 7900901**

**Int. Cl.³ A61K** *31/395;* **C07D** *405/04*

**U.S. Cl. 424—274** **14 Claims**

**1.** A compound selected from the group consisting of benzo[b]pyran of the formula:



and the pharmaceutically acceptable acid addition salts thereof wherein R is hydrogen, alkyl of 1 to 3 carbon atoms, alkanoyl of up to 8 carbon atoms or benzoyl,

$NR_1R_2$ is pyrrolidino, and the depicted cyano group is the 6-position.

**13.** A method of treating hypertension in a human which comprises administering thereto an effective amount of a compound according to claim **1**.

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**4,391,816**

## N-(NAPHTHALENYLTHIOXOMETHYL)AMINOACID DERIVATIVES

**Kazimir Sestanj, St. Laurent; Nedumparambil A. Abraham, Dollard des Ormeaux; Francesco Bellini, Mount Royal, and Adi Treasurywala, Point Claire, all of Canada, assignors to Ayerst, McKenna & Harrison Inc., Montreal, Canada**

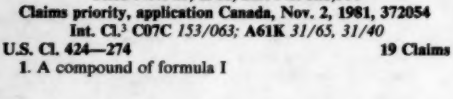
**Filed Nov. 13, 1981, Ser. No. 321,304**

**Claims priority, application Canada, Nov. 2, 1981, 372054**

**Int. Cl.³ C07C** *153/063;* **A61K** *31/65, 31/40*

**U.S. Cl. 424—274** **19 Claims**

**1.** A compound of formula I



wherein

$R^1$ is lower alkyl, carboxymethyl, phenyl or phenyl substituted with a substituent selected from halo, lower alkyl or lowe alkoxy;

$R^2$ is hydrogen or lower alkyl;

n is the integer O, 1 or 2; or

n is the integer O and $R^1$ and $R^2$ form a $(CH_2)_3$ bridge to complete a pyrrolidine ring with the nitrogen and carbon to which $R^1$ and $R^2$ are joined; and

$R^3$ is a halo substituent at position 3, 5, 6 or 7 of the naphthalene ring, or

$R^3$ is two or three substituents on the naphthalene ring selected from the group consisting of 4-lower alkoxy-5-[di(-lower alkyl)aminosulfonyl] and 3-halo-4-lower alkoxy-5-[(di(lower alkyl)aminosulfonyl];

with the proviso that when $R^1$ is lower alkyl, then $R^3$ is a halo substituent at position 3, 6 or 7 of the naphthalene ring or $R^3$ is two or three substituents as defined herein, or a therapeutically acceptable salt thereof with an organic or inorganic base.

**15.** A pharmaceutical composition for preventing or relieving diabetic complications in a diabetic mammal which comprises a compound of claim **1**, or a therapeutically acceptable salt thereof with an organic or inorganic base, and a pharmaceutically acceptable carrier.

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**4,391,817**

## PYRROLO-DIAZEPINE DERIVATIVES AND THEIR PHARMACEUTICAL COMPOSITIONS

**Luigi Mariani, and Giorgio Tarzia, both of Milan, Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy**

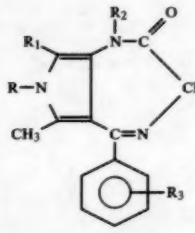
**Filed May 24, 1982, Ser. No. 381,271**

**Claims priority, application Italy, Jun. 8, 1981, 22177 A/81**

**Int. Cl.³ A61K** *31/55;* **C07D** *487/04*

**U.S. Cl. 424—274** **6 Claims**

**1.** A pyrrolo[3,4-e][1,4]diazepin-2(1H)-one of the formula



I

wherein R represents methyl, ethyl, propyl, 1-methylethyl, butyl, 1-methylpropyl, 2-methylpropyl, or 1,1-dimethylethyl, $R_1$ designates a chlorine or bromine atom or a nitro group, $R_2$ represents hydrogen, methyl, ethyl, propyl, 1-methylethyl, butyl, 1-methylpropyl, 2-methylpropyl, or 1,1-dimethylethyl, and $R_3$ is hydrogen, chloro, bromo, fluoro, trifluoromethyl or methoxy.

**5.** An anticonvulsant and antianxiety pharmaceutical preparation containing an effective amount of a compound of claim **1** as the active ingredient, along with a suitable pharmaceutical carrier.

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**4,391,818**

## 4-(SUBSTITUTED ALKYL)-N-(1,3-DITHIOLAN-2-YLIDENE(ANILINE

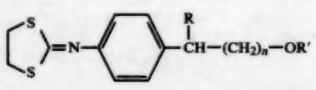
**Boyd L. Harrison, Cincinnati, and Niall S. Doherty, West Chester, both of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio**

**Filed Apr. 12, 1982, Ser. No. 367,540**

**Int. Cl.³ A61K** *31/385;* **C07D** *339/06*

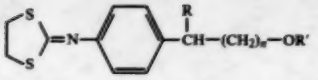
**U.S. Cl. 424—277** **10 Claims**

**1.** A compound of the formula



wherein R is hydrogen or lower alkyl of 1–6 C; R′ is hydrogen, lower alkyl of 1–6 C, or lower alkanoyl of 2–6 C; and n is 0–10; and the pharmaceutically acceptable acid addition salts thereof.

**9.** A method of treating inflammation which comprises administering to a patient in need thereof an effective amount of a compound of the formula



wherein R is hydrogen or lower alkyl of 1–6 C; R′ is hydrogen, lower alkyl of 1–6 C or lower alkanoyl of 2–6 C; and n is 0–10; and the pharmaceutically acceptable acid addition salts thereof.

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**4,391,819**

## 2,9-DIOXA TRICYCLO [4,3,1,0$^{3,7}$] DECANE COMPOUNDS AND PROCESS OF MAKING SAME

**Peter W. Thies, and Samuel David, both of Hanover, Fed. Rep. of Germany, assignors to Kali-Chemie Pharma GmbH, Hanover, Fed. Rep. of Germany**

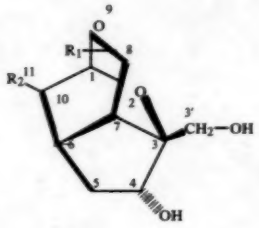
**Filed Jul. 13, 1981, Ser. No. 283,104**

**Claims priority, application Fed. Rep. of Germany, Jul. 14, 1980, 3026579**

**Int. Cl.**$^3$ **A61K** *31/335;* **C07D** *405/06*

**U.S. Cl. 424—278** **11 Claims**

1. A 3$\beta$-hydroxy methyl-4$\alpha$-hydroxy-3$\beta$-alkoxy-2,9-dioxa tricyclo[4,3,1,0$^{3,7}$]decane of the formula



in which

$R_1$ indicates an alkoxy group and

$R_2$ indicates 10-methylene or 10$\beta$-methyl.

10. A composition of matter for inducing sleep in mammals, comprising a sleep-inducing amount of a 3$\beta$-hydroxy methyl-4$\alpha$-hydroxy-8$\beta$-alkoxy-2,9-dioxa tricyclo[4,3,1,0$^{3,7}$]decane as defined in claim 1, and a pharmacologically inert diluent material.

11. A method of inducing sleep in mammals, comprising the step of administering to a mammal a sleep-in-ducing amount of a compound as defined in claim 1.

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**4,391,820**

## INSECTICIDAL ESTER ENANTIOMERS

**George Holan, Brighton, and Reimund Walser, Box Hill, both of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Australia**

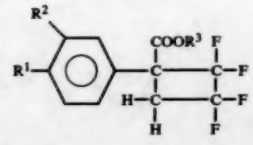
**Filed Jun. 2, 1981, Ser. No. 269,735**

**Claims priority, application Australia, Jun. 13, 1980, PE4038/80**

**Int. Cl.**$^3$ **A01N** *43/16;* **C07C** *69/76;* **A01N** *37/10*

**U.S. Cl. 424—282** **9 Claims**

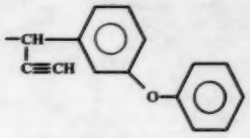
1. Compounds of the formula Ia



Ia

characterised in that $R^1$ is ethoxy or chloro, and $R^2$ is hydrogen;

$R^3$ is



and the compounds are in the form of the (−)(−) diastereoisomers.

4. Insecticidal compositions, characterised in that they comprise an insecticidally effective amount of one or more of the compounds stated in claim 1, incorporated in a suitable inert liquid or solid carrier.

9. A method of combatting insect pests, characterised in that an insecticidally effective amount of a compound or composition as claimed in any one of claims 1 to 3 or 4 to 8, is applied to the insects and/or their locus.

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**4,391,821**

## 7-SUBSTITUTED BENZOPYRANES AND PROCESS FOR THE PREPARATION THEREOF

**Dezso Korbonits; Mihaly Nogradi; Borbala Vermes nee Szluha; Janos Strelisky; Andras Wolfner; Gergely Heja; Gabor Kovacz, all of Budapest; Jozsef Szegi, Debseccen, and Sandor Virag, Budapest, all of Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara R.T., Budapest, Hungary**

**Filed Jul. 17, 1981, Ser. No. 284,573**

**Claims priority, application Hungary, Dec. 16, 1980, 3001**

**Int. Cl.**$^3$ **A61K** *31/35;* **C07D** *311/22, 311/58*

**U.S. Cl. 424—283** **29 Claims**

1. A compound of the formula (I)

or a pharmaceutically acceptable acid addition or quaternary $C_1$–$C_4$-alkyl ammonium halide, sulfate or phosphate salt thereof, wherein

$R_1$ and $R_2$ are each hydrogen, $C_1$ to $C_6$ alkyl, hydroxy-alkyl, alkenyl, cycloalkyl, phenyl-alkyl or dimethoxy-phenyl-alkyl;

$R_3$ is hydrogen, $C_1$ to $C_4$ alkyl or phenyl;

$R_4$ is hydrogen;

$R_5$ is hydrogen or phenyl; but if $R_3$ is other than phenyl, $R_4$ and $R_5$ together represent a bonding electron pair between the 2- and 3-positions of the benzopyrane nucleus;

$R_6$ and $R_7$ are each hydrogen or together form an oxo group; and n is 1 to 2, with the proviso that the pyrane ring may bear only one alkyl or phenyl substituent.

**4,391,822**

## METHOD FOR PREVENTING CATS FROM SHEDDING TOXOPLASMA OOCYSTS AFTER INFECTION OF SUCH CATS

**Jacob K. Frenkel, Overland Park, Kans., and Donald D. Smith, Independence, Mo., assignors to Kansas University Endowment Association, Lawrence, Kans.**

**Filed Jul. 30, 1982, Ser. No. 403,788**
**Int. Cl.³ A61K *31/35***
**U.S. Cl. 424—283** **9 Claims**

1. A method of preventing or minimizing shedding of Toxoplasma oocysts by a cat after Toxoplasma infection of such cat, comprising the steps of administering to the cat, prior to the onset of oocyst shedding, an effective amount of an agent selected from the group consisting of monensin and salinomycin, and continuing such administration for a period of time thereafter sufficient to maintain said prevention or minimization.

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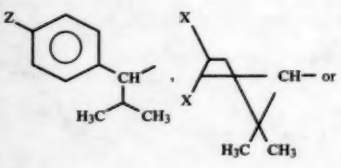
**4,391,823**

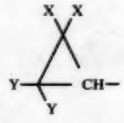
## NOVEL POLYCYCLIC INSECTICIDAL ESTERS

**Dena L. Boxler, Lockport, N.Y., and Albert C. Chen, East Brunswick, N.J., assignors to Rhone-Poulenc Agrochimie, Lyons, France**

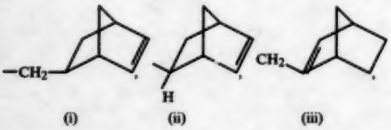
**Continuation-in-part of Ser. No. 122,228, Feb. 19, 1980, abandoned. This application Jul. 20, 1981, Ser. No. 285,241**
**Int. Cl.³ C07C *69/743, 69/747, 69/612;* A01N *53/00***
**U.S. Cl. 424—306** **45 Claims**

1. A compound having the formula: where $R^1$ is

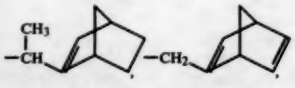




wherein X is F, Cl, Br or methyl; Y is methyl or Cl; Z is F, Cl, Br, $CF_3$, $CF_3O$, $CF_3S$, $CHF_2$, $CHF_2O$, or $CHF_2S$; and $R^2$ is

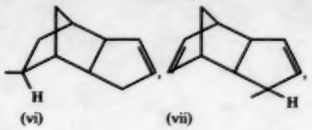


(i) (ii) (iii)

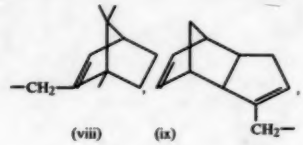


(iv) (v)

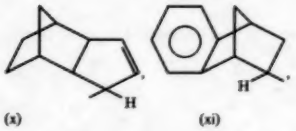
-continued



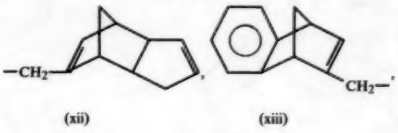
(vi) (vii)



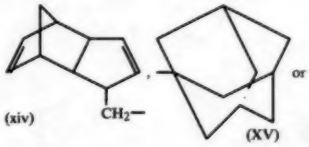
(viii) (ix)



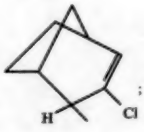
(x) (xi)



(xii) (xiii)

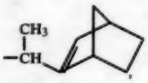


(xiv) (XV)



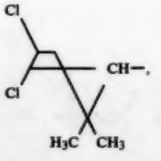
(xvi)

with the provisos that when $R^2$ is



(iv)

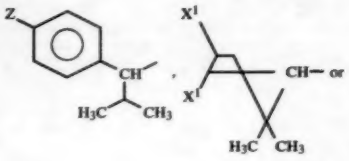
then $R^1$ must be

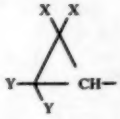


and when $R^2$ is

(xv)

then $R^1$ must be





wherein $X^1$ is F, Cl or Br, and X, Y and Z are defined as above.

6. An insecticidal composition that comprises a carrier for an insecticide and an insecticidal amount of a compound of claim 1.

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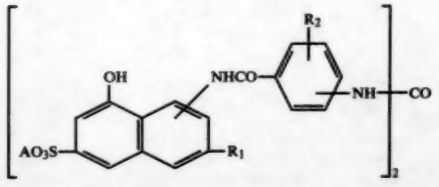
**4,391,824**

## UREYLENEBIS (HYDROXY NAPHTHALENESULFONIC ACIDS)

**Gerald J. Siuta, and Seymour Bernstein, both of New City, N.Y., assignors to American Cyanamid Company, Stamford, Conn.**

**Filed Jul. 27, 1981, Ser. No. 286,736**
**Int. Cl.³ A61K 31/185**
**U.S. Cl. 424—315** **15 Claims**

1. A method of inhibiting connective tissue destruction in a warm-blooded animal suffering from connective tissue destruction disease which comprises administering to said warm-blooded animal an effective connective tissue destruction inhibiting amount of a compound selected from those of the formula:



wherein $R_1$ is selected from the group consisting of hydrogen and $—SO_3A$; $R_2$ is selected from the group consisting of hydrogen, ortho-$SO_3A$, ortho-methyl and meta-methyl; and A is selected from the group consisting of hydrogen and a nontoxic pharmaceutically acceptable cation salt.

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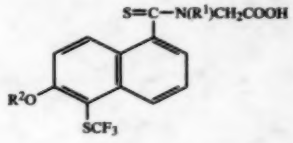
**4,391,825**

## N-[[6-(LOWER ALKOXY)-5-(TRIFLUOROMETHYLTHIO)-1-NAPHTHALENYL]THIOXOMETHYL]-N-(LOWER ALKYL)GLYCINES

**Francesco Bellini, Mount Royal; Kazimir Sestanj, St. Laurent, and Leslie G. Humber, Dollard des Ormeaux, all of Canada, assignors to Ayerst, McKenna & Harrison Inc., Montreal, Canada**

**Filed Nov. 13, 1981, Ser. No. 321,300**
**Claims priority, application Canada, Oct. 15, 1981, 387991**
**Int. Cl.³ C07C 153/063; A61K 31/165**
**U.S. Cl. 424—319** **8 Claims**

1. A compound of formula I



(I)

wherein $R^1$ and $R^2$ each is lower alkyl, or a therapeutically acceptable salt thereof with an organic or inorganic base.

4. A pharmaceutical composition for preventing or relieving diabetic complications in a diabetic mammal, which comprises a compound of claim 1, or a therapeutically acceptable salt thereof with an organic or inorganic base, and a pharmaceutically acceptable carrier.

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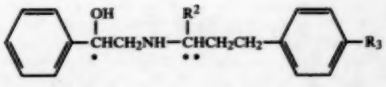
**4,391,826**

## PHENETHANOLAMINES, COMPOSITIONS CONTAINING THE SAME, AND METHOD FOR EFFECTING WEIGHT CONTROL

**Jack Mills; Klaus K. Schmiegel, and Walter N. Shaw, all of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.**

**Continuation-in-part of Ser. No. 921,670, Jul. 3, 1978, abandoned. This application Nov. 21, 1979, Ser. No. 96,361**
**Int. Cl.³ A01N 37/18**
**U.S. Cl. 424—324** **20 Claims**

1. A pharmaceutical formulation useful in the control of weight in obese animals comprising as active principle an amount effective for controlling weight of an optically active phenethanolamine of the formula



wherein:

$R_2$ is hydrogen, methyl or ethyl;

$R_3$ is aminocarbonyl or methylaminocarbonyl;

$\overset{*}{C}$ is an asymmetric carbon atom having the R absolute stereochemical configuration;

$\overset{**}{C}$ is an asymmetric carbon atom when $R_2$ is methyl or ethyl, and when asymmetric is of the S absolute stereochemical configuration; and the non-toxic pharmaceutically acceptable acid addition salts thereof, in combination with a suitable pharmaceutical carrier therefor.

**4,391,827**

## 3-(2-HYDROXY-4-(SUBSTITUTED)PHENYL)-CYCLOALKANONE AND CYCLOALKANOL ANALGESIC AGENTS AND INTERMEDIATES THEREFOR

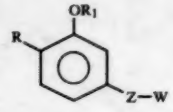
**Charles A. Harbert, Waterford; Michael R. Johnson, and Lawrence S. Melvin, Jr., both of Gales Ferry, all of Conn., assignors to Pfizer Inc., New York, N.Y.**

**Division of Ser. No. 185,082, Sep. 8, 1980, Pat. No. 4,306,097, which is a continuation-in-part of Ser. No. 926,687, Jul. 25, 1978, abandoned, which is a continuation-in-part of Ser. No. 833,102, Sep. 13, 1977, abandoned. This application Jul. 27, 1981, Ser. No. 286,809**

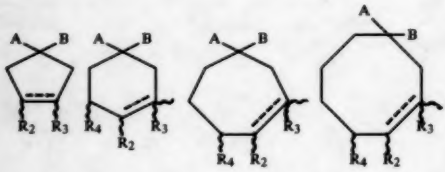
**Int. Cl.**[3] **A61K** *31/12*; **C07C** *49/237*

**U.S. Cl. 424—331** **36 Claims**

1. A compound selected from the group consisting of those having the formula



wherein R is selected from the group consisting of saturated and unsaturated cycloalkyl moieties selected from the group consisting of



I-A I-B I-C and I-D

wherein

A when taken alone is hydrogen;

B when taken alone is selected from the group consisting of hydroxy, hydroxymethyl and alkanoyloxy having from one to five carbon atoms;

A and B when taken together are selected from the group consisting of oxo and alkylenedioxy having from two to four carbon atoms

$R_1$ is selected from the group consisting of hydrogen, alkanoyl having from one to five carbon atoms, $P(O)(OH)_2$ and mono- and disodium and potassium salts thereof, $-CO(CH_2)_2COOH$ and the sodium and potassium salts thereof, and $-CO(CH_2)_pNR_5R_6$ wherein p is an integer from 1 to 4, each of $R_5$ and $R_6$ when taken together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring (piperidino, pyrrolo, pyrrolidino, morpholino and N-alkylpiperazino having from one to four carbon atoms in the alkyl group);

$R_2$ is selected from the group consisting of hydrogen, alkyl having from one to six carbon atoms, alkenyl having from three to six carbon atoms and phenylalkyl having from one to two carbon atoms in the alkyl moiety;

$R_3$ is hydrogen;

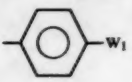
$R_4$ is selected from the group consisting of hydrogen and alkyl having from one to six carbon atoms;

Z is selected from the group consisting of

(a) alkylene having from four to eleven carbon atoms; and

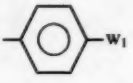
(b) $-(alk_1)_m-O-(alk_2)_n-$ wherein each of $(alk_1)$ and $(alk_2)$ is alkylene having from one to eleven carbon atoms; each of m and n is 0 or 1; with the provisos that the summation of carbon atoms in $(alk_1)$ plus $(alk_2)$ is not less than four or greater than eleven; and at least one of m and n is 1;

W is selected from the group consisting of hydrogen, pyridyl and



wherein $W_1$ is selected from the group consisting of hydrogen, fluoro and chloro;

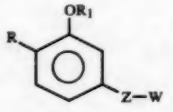
with the provisos that when W is hydrogen, B is other than hydroxy, Z is alkylene having from seven to eleven carbon atoms or $-(alk_1)_m-O-(alk_2)_n-$ wherein each of $(alk_1)$ and $(alk_2)$ is alkylene having from one to eleven carbon atoms with the further proviso that the summation of carbon atoms in $(alk_1)$ plus $(alk_2)$ is not less than seven or greater than eleven carbon atoms; and when W is



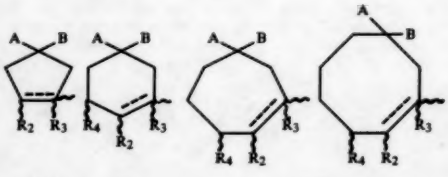
or pyridyl, Z is alkylene having from four to seven carbon atoms or $-(alk_1)_m-O-(alk_2)_n-$ wherein each of $(alk_1)$ and $(alk_2)$ is alkylene having from one to seven carbon atoms with the further proviso that the summation of carbon atoms in $(alk_1)$ plus $(alk_2)$ is not less than four or greater than seven carbon atoms;

and the pharmaceutically acceptable acid addition salts of those compounds wherein $R_1$ is $-CO(CH_2)_pNR_5R_6$ and-/or W is pyridyl.

21. A pharmaceutical composition in unit dosage form comprising a pharmaceutically acceptable carrier or diluent and an analgesic, tranquilizer, sedative, antiaxiety or anticonvulsant effective amount of a compound selected from the group consisting of those having the formula



wherein R is selected from the group consisting of saturated and unsaturated cycloalkyl moieties selected from the group consisting of



I-A I-B I-C and I-D

wherein

A when taken alone is hydrogen;

B when taken alone is selected from the group consisting of hydroxy, hydroxymethyl and alkanoyloxy having from one to five carbon atoms;

A and B when taken together are selected from the group consisting of oxo and alkylenedioxy having from two to four carbon atoms

$R_1$ is selected from the group consisting of hydrogen, alkanoyl having from one to five carbon atoms, $P(O)(OH)_2$ and

mono- and disodium and potassium salts thereof, $—CO(CH_2)_2COOH$ and the sodium and potassium salts thereof, and $—CO(CH_2)_pNR_5R_6$ wherein p is an integer from 1 to 4, each of $R_5$ and $R_6$ when taken together with the nitrogen to which they are attached form a 5- or 6-membered heterocyclic ring (piperidino, pyrrolo, pyrrolidino, morpholino and N-alkylpiperazino having from one to four carbon atoms in the alkyl group);

$R_2$ is selected from the group consisting of hydrogen, alkyl having from one to six carbon atoms, alkenyl having from three to six carbon atoms and phenylalkyl having from one to two carbon atoms in the alkyl moiety;

$R_3$ is hydrogen;

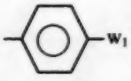
$R_4$ is selected from the group consisting of hydrogen and alkyl having from one to six carbon atoms;

Z is selected from the group consisting of

(a) alkylene having from four to eleven carbon atoms; and

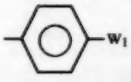
(b) $—(alk_1)_m—O—(alk_2)_n—$ wherein each of $(alk_1)$ and $(alk_2)$ is alkylene having from one to eleven carbon atoms; each of m and n is 0 or 1; with the provisos that the summation of carbon atoms in $(alk_1)$ plus $(alk_2)$ is not less than four or greater than eleven; and at least one of m and n is 1;

W is selected from the group consisting of hydrogen, pyridyl and



wherein $W_1$ is selected from the group consisting of hydrogen, fluoro and chloro;

with the provisos that when W is hydrogen, Z is alkylene having from seven to eleven carbon atoms or $—(alk_1)_m—O—(alk_2)_n—$ wherein each of $(alk_1)$ and $(alk_2)$ is alkylene having from one to eleven carbon atoms with the further proviso that the summation of carbon atoms in $(alk_1)$ plus $(alk_2)$ is not less than seven or greater than eleven carbon atoms; and when W is



or pyridyl, Z is alkylene having from four to seven carbon atoms or $—(alk_1)_m—O—(alk_2)_n—$ wherein each of $(alk_1)$ and $(alk_2)$ is alkylene having from one to seven carbon atoms with the further proviso that the summation of carbon atoms in $(alk_1)$ plus $(alk_2)$ is not less than four or greater than seven carbon atoms;

and the pharmaceutically acceptable acid addition salts of those compounds wherein $R_1$ is $—CO(CH_2)_pNR_5R_6$ and/or W is pyridyl.

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**4,391,828**

## DIBUTYLORTHOBENZYLMETHOXYBENZENES AND DIBUTYLORTHOCINNAMYLMETHOXYBENZENES AS MOSQUITO LARVAE GROWTH INHIBITORS

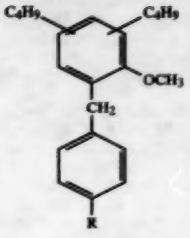
**Leonard Jurd, Berkeley, Calif., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.**

**Filed Apr. 20, 1982, Ser. No. 370,019**

**Int. Cl.³ A01N 31/14; C07C 43/205**

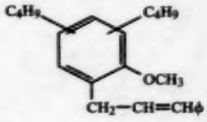
**U.S. Cl. 424—340** **9 Claims**

1. A compound of the structure



wherein R is hydrogen, lower alkyl containing from 1 to 6 carbon atoms or lower alkoxy containing from 1 to 6 carbon atoms.

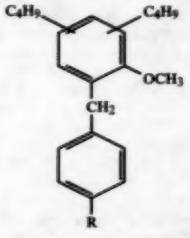
4. A compound of the structure



6. A method of inhibiting growth of mosquito larvae, which comprises:

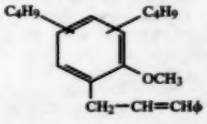
administering to the larvae an effective growth inhibiting amount of a compound selected from the group consisting of

(a) compounds of the structure



wherein R is hydrogen, lower alkyl containing from 1 to 6 carbon atoms or lower alkoxy containing from 1 to 6 carbon atoms, and

(b) compounds of the structure



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**4,391,829**

## DUAL ENZYME DIGESTION FOR A DOG FOOD OF IMPROVED PALATABILITY

**Joseph E. Spradlin; Jeffrey D. Morgan, both of Bourbonnais; Allan R. Olson, Ashkum, and Joseph P. Howley, Flossmoor, all of Ill., assignors to General Foods Corporation, White Plains, N.Y.**

**Filed Aug. 13, 1981, Ser. No. 292,471**

**Int. Cl.³ A23K 1/00, 1/18**

**U.S. Cl. 426—28** **37 Claims**

1. A process for preparing a nutritionally-balanced dog food

having improved palatability, said dog food comprising fat, protein, carbohydrates, vitamins and minerals and containing of a weight basis from 20% to 80% farinaceous ingredients and from 20% to 80% proteinaceous ingredients, including proteinaceous meaty material at from about 25% to about 55% by weight of the proteinaceous ingredients, said process comprising the steps of:

(a) preparing a farinaceous slurry comprising from about 30% to 70% water and from about 5% to about 25% of the total weight of said farinaceous ingredients;

(b) forming a farinaceous reaction product by treating the farinaceous material in said farinaceous slurry with added alpha-amylase and protease enzymes in an amount and under conditions effective to convert at least a portion of the farinaceous material to a mixture of oligo saccharides ranging in size from 1 to 10 monomer units, and at least a portion of the proteinaceous material to a mixture of peptides ranging in size from 2 to 300 monomer units, and effective to reduce the viscosity of the slurry by 50%;

(c) preparing a proteinaceous slurry comprising water and a major portion of the proteinaceous meaty material;

(d) forming a proteinaceous reaction product by treating the proteinaceous material in the proteinaceous slurry with protease enzymes in an amount and under conditions effective to convert at least a portion of the proteinaceous material to peptides ranging in size from 2 to 300 monomer units and effective to reduce the viscosity of the slurry by 50%; and

(e) incorporating the farinaceous and proteinaceous reaction products into a dog food in an amount effective to provide a significant increase in the palatability of the dog food to dogs.

**19**. A process for preparing a nutritionally-balanced dog food having improved palatability, said dog food comprising fat, protein, carbohydrates, vitamins and minerals and containing of a weight basis from 20% to 80% farinaceous ingredients and from 20% to 80% proteinaceous ingredients, including proteinaceous meaty material at from about 25% to about 55% by weight of the proteinaceous ingredients, said process comprising the steps of:

(a) preparing a farinaceous slurry comprising from about 30% to about 70% water and from about 5% to about 25% of the total weight of said farinaceous ingredients;

(b) forming a farinaceous reaction product by treating said farinaceous material in the farinaceous slurry with added alpha-amylase enzyme in an amount and under conditions effective to convert at least a portion of the farinaceous material to a mixture of oligosaccharides ranging in size of from 1 to 10 monomer units and effective to reduce the viscosity of the slurry by 50%; and thereafter,

(c) admixing a major portion of the proteinaceous meaty material with said reacted farinaceous slurry to prepare a combined slurry; thereafter,

(d) forming a reaction product by treating the combined slurry with proteolytic enzyme in an amount and under conditions effective to convert at least a portion of the proteinaceous material to peptides ranging in size from 2 to 300 monomer units; and

(e) incorporating the reaction product of the combined slurry into dog food in an amount effective to provide a significant increase in the palatability of the dog food to dogs.

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**4,391,830**

## PRODUCTION OF LIQUID YOGURT STABILIZED WITH HIGH METHOXYL PECTIN

**Geir V. Gudnason, Atlanta; Laurie M. Crowe, Smyrna, and Shin S. Chang, Stone Mountain, all of Ga., assignors to Coca Cola Company, Atlanta, Ga.**

**Filed May 21, 1981, Ser. No. 265,885**
**Int. Cl.³ A23C *9/12***
**U.S. Cl. 426—43** **7 Claims**

**1**. In a method for preparing a liquid yogurt by inoculating pasteurized dairy ingredients with a bacterial culture to form a yogurt curd and homogenizing the curd to form the liquid yogurt, the improvement which comprises:

mixing the curd with a high methoxyl pectin after the pH of the curd has become less than 4.6 and before the curd is homogenized, to form a curd-pectin mixture, the amount of pectin being from about 0.4% to about 0.7% by weight relative to the solids content of the mixture, and

passing the mixture through an homogenizing orifice at a pressure of from about 40 to 150 p.s.i. to produce a stabilized liquid yogurt.

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**4,391,831**

## ANIMAL FEED COMPOSITION AND METHOD FOR PRODUCING SAME

**Joy E. Knobloch, 113 E. Haven, New Lenox, Ill. 60451**

**Filed Jan. 13, 1981, Ser. No. 224,681**
**Int. Cl.³ A23K *1/00***
**U.S. Cl. 426—93** **9 Claims**

**1**. A method for producing an animal feed comprising contacting particles of base feed material with a mixture comprising an aqueous liquid phase derived from at least one plant and substantially whole plant matter from said plant to deposit at least a portion of said plant matter on at least a portion of said particles and form deposit containing particles, and drying said deposit containing particles to remove at least a portion of said liquid phase and form dried deposit containing particles having deposited thereon substantially whole plant matter.

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**4,391,832**

## PROCESS FOR MAKING MULTI-LAYER CREAM-FILLED WAFER BLOCKS

**Franz Haas, Sr., Gerstlgasse 25, A-1210 Wien; Franz Haas, Jr., Castellezgasse 32, A-1020 Wien, and Johaan Haas, Wiener Strasse 209-215, A-2104 Spillern, N.Ö., all of Austria**

**Filed Jun. 16, 1981, Ser. No. 274,247**
**Claims priority, application Austria, Jun. 18, 1980, 3219/80**
**Int. Cl.³ A21D *13/00*; A23G *3/00***
**U.S. Cl. 426—275** **3 Claims**

**1**. A process for making multi-layer, filled wafer blocks having layers of wafer sheets, each wafer sheet having an upper and lower side, the process comprising the steps of:

(a) applying a coating to the upper side of a first wafer sheet to form a first coated wafer sheet;

(b) conveying, with a feeder conveyor, the first coated wafer sheet in a first plane to a stacking point at which stacking point the first wafer sheet is to be raised into a second plane which is above the first plane;

(c) separately supplying, simultaneously with said conveying step, an uncoated covering wafer sheet for each wafer block, said supplying being carried out such that the covering wafer sheet is delivered directly into said second plane at the stacking point without being transported along the feeder conveyor;

(d) thereafter raising the first coated wafer sheet into the second plane and, by such raising, attaching the first coated wafer sheet to the lower side of the uncoated covering wafer sheet already in the second plane to form a stack of two wafer sheets, which stack is in a raised position with respect to the feeder conveyor, said attaching being effected by the contact of the coating of the first coated wafer sheet with the lower side of the uncoated covering sheet in the second plane;

(e) forming a completed stack of wafer sheets constituting a completed wafer block by, if one or more additional layers are desired, applying a coating to an additional wafer sheet to form an additional coated wafer sheet; conveying, with the feeder conveyor, the additional wafer sheet in the first plane to the stacking point; thereafter raising the additional coated wafer sheet into the second plane and by such raising; attaching the additional coated wafer sheet to the lower side of a wafer sheet at the bottom of the stack of wafer sheets in the second plane, and repeating

said steps of applying a coating to an an additional wafer sheet, conveying the additional coated wafer sheet, raising the additional coated wafer sheet, and attaching the additional coated wafer sheet, n minus 3 times, where n is the number of sheets in the final stack; and

(f) thereafter removing the completed wafer block from the stacking point.

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4,391,833

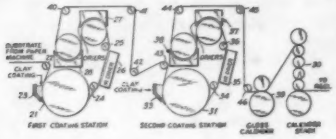
## METHOD OF MAKING AND USING HEAT RESISTANT RESIN COATED PAPERBOARD PRODUCT AND PRODUCT THEREOF

Robert W. Self, and Allan A. Whillock, both of Mobile, Ala., assignors to International Paper Company, New York, N.Y.

Continuation of Ser. No. 610,448, Sep. 4, 1975, abandoned. This application Apr. 24, 1978, Ser. No. 899,238

Int. Cl.³ A23L *1/00*; A21B *3/15*; B32D *27/10*; B65D *27/10*

U.S. Cl. 426—523 17 Claims



9. A paperboard container for cooking food comprising a coated paperboard substrate formed into the shape of a container, said container comprising:

(a) an inside surface comprising a water impermeable layer affixed to said paperboard substrate, said water impermeable layer comprising a binder with opaque pigment dispersed therein; and

(b) an outside surface comprising a continuous water permeable layer affixed to said paperboard substrate, said water permeable layer comprising a binder with opaque pigment dispersed therein, said paperboard container being characterized by the facts that (i) it retains a brightness of at least 70% on its permeable side and at least 50% on its impermeable side after exposure to 400° F. for 30 minutes; and (ii) it will not puff or blister when placed in an oven heated to 350° F. for 15 minutes.

10. A process for cooking food in a paperboard container comprising heating food in the container defined by claim 9.

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4,391,834

## METHOD OF EXTENDING AND FLAVORING ICE MILK OR CREAM

James T. Fiscella, Ottumwa, Iowa, assignor to TJT Food Flavoring, Inc., Ottumwa, Iowa

Continuation-in-part of Ser. No. 132,872, Mar. 24, 1980, abandoned. This application Mar. 5, 1982, Ser. No. 355,166

Int. Cl.³ A23G *9/021*

U.S. Cl. 426—565 11 Claims

1. A method of extending and flavoring a soft serve product independently of any heating step, comprising the steps of,

providing in liquid form a soft serve product selected from the group consisting of ice cream, ice milk and non-dairy ice cream, said soft serve product having a solids content of between 25% and 30%,

providing a gelatin mix including sugar, gelatin and flavoring in quantities approximately proportional to 18 grams gelatin per 170 grams of mix, the non-gelatin portion of said mix being substantially sugar,

stirring the gelatin mix into cold water in quantities approximately proportional to six ounces of mix to one gallon of water, thereby producing a gelatin extender, and

adding said gelatin extender to a liquid soft serve product in quantities approximately proportional to one gallon of gelatin extender to between three and four gallons of said soft serve product, thereby producing an extended and flavored soft serve product.

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4,391,835

## METHOD FOR MAKING SIMULATED TOFU PRODUCTS

Tsutomu Katayama, Izumisano, and Toyohiko Nakanishi, Nanao, both of Japan, assignors to Fuji Oil Company, Limited, Osaka, Japan

Filed Jan. 15, 1981, Ser. No. 225,320

Claims priority, application Japan, Feb. 1, 1979, 54-11054

Int. Cl.³ A23J *3/00*; A23L *1/325*

U.S. Cl. 426—573 8 Claims

1. A method for making a simulated tofu product which comprises the steps of preparing a mixture consisting essentially of soybean protein, fish protein, water, edible oil and salt, wherein the weight ratio of the amount of the fish protein relative to that of the soybean protein is within the range of 5:95 to 75:25 based on the part-by-weight of the solids thereof, the amount of the water and that of the edible oil are 5 to 8 parts and 0 to 4 parts by weight, respectively, both being relative to one part by weight of the total weight of the solids of the soybean and fish proteins, and wherein the amount of the salt is present in an amount sufficient to solubilize the fish protein; mixing the mixture uniformly; and heating the mixture to temperatures sufficient to coagulate the mixture.

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4,391,836

## PROCESS FOR PREPARING INSTANT GELLING STARCHES

Chung-Wai Chiu, Westfield, N.J., assignor to National Starch and Chemical Corporation, Bridgewater, N.J.

Continuation-in-part of Ser. No. 176,320, Aug. 8, 1980. This application May 10, 1982, Ser. No. 376,348

Int. Cl.³ A23L *1/195*, *1/187*, *1/04*, *1/06*

U.S. Cl. 426—578 14 Claims

1. A cold-water-dispersible gelling starch, which comprises a drum-dried and subsequently heat-treated tapioca starch or potato starch which is characterized by being capable of forming at least a weak gel having a Bloom strength of at least about 70 grams and further characterized by having a reduced peak or maximum Brabender viscosity within the range of about 1000–4200 B.U. for said tapioca starch or within the range of 2400–4400 B.U. for said potato starch, said viscosity being measured at 5.5% solids for said tapioca starch or at 5% solids for said potato starch in a sugar solution at 30° C. over a 30 minute period; said starch being a native starch having a pH of about 5–12 prior to said drum drying; said drum drying being carried out at a temperature sufficient to pregelatinize said starch and render it cold-water-dispersible; and said heat-treatment being carried out at up to 180° C. for a time and at a temperature and pH sufficient to reduce said peak or maximum Brabender viscosity to said ranges.

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4,391,837

## PROCESS FOR THE MANUFACTURE OF A LIQUID, PASTE OR POWDER WHEY PRODUCT SIMULATIVE OF A SKIN MILK PRODUCT

Johann Kocher, Salzburg County, Austria, assignor to Alpi Milchindustrie reg. Gen. m.b.H., Salzburg, Austria

Filed May 30, 1979, Ser. No. 43,699

Claims priority, application Austria, May 30, 1978, 3909/78

Int. Cl.³ A23C *21/00*

U.S. Cl. 426—583 4 Claims

1. The process for the manufacture of a liquid, paste or powder whey product in which the proportions of protein, lactose and ash substantially correspond to those in skim milk and which whey product is suitable as an additive to foodstuffs and feeds, which comprises the steps of: subjecting whey, as a starting material, to an ultrafiltration membrane separation to separate said whey starting material into a permeate fraction and a retentate fraction in which the volume of said retentate

fraction is about 1/20th of the volume of said whey starting material and which retentate fraction contains a higher proportion of protein and lower proportions of lactose and ash than said whey starting material; and then mixing said retentate fraction with a whey concentrate containing at least 50 wt. % of solids or dry whey powder, wherein the mixing ratio of (1) said retentate to (2) said whey concentrate or said dry whey powder, is about 4:5, calculated as the solids, whereby to obtain said whey product.

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**4,391,838**

## PROCESS FOR CONTINUOUS FLUIDIZATION OF SHORTENING

**Daniel R. Pate, Strongsville, Ohio, assignor to SCM Corporation, New York, N.Y.**

**Filed Nov. 13, 1981, Ser. No. 320,860**
**Int. Cl.³ A23D** *5/02*
**U.S. Cl. 426—606** **22 Claims**

1. A process for the continuous fluidization of a feed mixture comprising a major amount of a normally liquid base oil and a minor amount less than about 20% by weight of a normally solid lipid, said normally solid lipid exhibiting polymorphic crystalline behavior and having a beta crystal-forming tendency in said base oil, which process comprises: passing a flow of said feed mixture through a heat exchange zone that is maintained under substantially anaerobic conditions while submitting it to a sequence of at least two temperature oscillations that alternate between (a) a higher temperature which is above the melting temperature of alpha crystals in the solidifying lipid present but below the melting temperature of beta crystals in the solidifying lipid present and (b) a lower temperature which is below the melting temperature of alpha crystals in the solidifying lipid present but sufficiently high to maintain the fluency of the materials in process, continuing said temperature oscillations in said zone until a substantial proportion of said normally solid lipid is transformed into beta crystal form, and withdrawing the resulting composition from said heat exchange zone.

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**4,391,839**

## METHOD OF MODIFYING THE CONFORMATION OF FOOD AND FEED PROTEINS

**Tibor Devenyi; Klara K. Bocsa; Ferenc Kovats; Sandor Pongor; Gertrud Szabolcsi, and Mihaly Such, all of Budapest, Hungary, assignors to MTA Szegedi Biologiai Kozpont Enzimologiai Intezete, Budapest, Hungary**

**Continuation-in-part of Ser. No. 179,980, Aug. 21, 1980, abandoned. This application Mar. 26, 1981, Ser. No. 247,645**
**Claims priority, application Hungary, Dec. 21, 1979, MA 3255**
**Int. Cl.³ A23K** *1/00*
**U.S. Cl. 426—626** **5 Claims**

1. A method of modifying the conformation of plant proteins of cereal, vegetable or oil-seed origin for increasing their biological utilization, which consists essentially of:

(a) treating said plant protein in dry form with agitation in gaseous hydrogen chloride for a period of about 1 to 1.5 minutes sufficient to increase the digestibility of said plant protein without bringing the protein into solution or suspension, said gaseous hydrogen chloride lowers the pH to a value between 1.7 and 2.3 as measured in a 20% w/v aqueous suspension; and

(b) raising the pH of said plant protein to a value between 4 and 7 by adding calcium hydroxide, so that the moisture content of said plant protein is increased up to 50% by weight.

**4,391,840**

## PROCESS FOR PREPARING MEAT PRODUCTS CONTAINING A PROTEIN EXTENDER WITH TITANIUM DIOXIDE TRACER

**John A. Ederle, St. Louis; Ralph A. Hoer, Ballwin, and George H. Irwin, Manchester, all of Mo., assignors to Ralston Purina Company, St. Louis, Mo.**

**Filed May 26, 1981, Ser. No. 266,693**
**Int. Cl.³ A23L** *1/31*
**U.S. Cl. 426—641** **6 Claims**

1. A process for preparing natural meat products containing extruded vegetable protein extender with titanium dioxide tracer comprising:

a. blending isolated vegetable protein capable of being rendered insoluble and titanium dioxide.

b. hydrating said blend,

c. reacting said hydrated blend under elevated temperature until said protein is substantially insolubilized thereby forming a matrix;

d. adding said matrix as fine particles in dried form to a vegetable protein to form a mixture,

e. hydrating said mixture,

f. extruding said hydrated mixture to form a vegetable protein extender,

g. combining said extender with a natural meat product whereby the pigmentation of the titanium dioxide does not detract from the appearance of the combined product.

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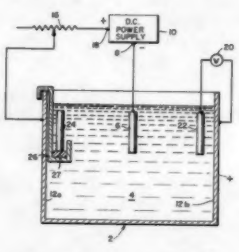
**4,391,841**

## PASSIVATION OF METALLIC EQUIPMENT SURFACES IN ELECTROLESS COPPER DEPOSITION PROCESSES

**Rudolph J. Zeblisky, Hauppauge, N.Y., assignor to Kollmorgen Technologies Corporation, Dallas, Tex.**

**Continuation of Ser. No. 130,451, Mar. 28, 1980, abandoned, which is a continuation-in-part of Ser. No. 34,812, Apr. 30, 1979, abandoned. This application Feb. 1, 1982, Ser. No. 344,801**
**Int. Cl.³ C23C** *3/02*
**U.S. Cl. 427—12** **25 Claims**




1. In a method for electrolessly depositing copper from an electroless copper deposition solution of known mixed potential on at least one substrate sensitive to such deposition, the improvement for rendering the metallic surfaces of plating equipment in contact with the solution substantially resistant to electroless copper deposition, comprising:

(1) initially imposing on said metallic plating equipment surfaces an electrical potential more positive than the mixed potential of the electroless copper solution but not substantially more positive than required to render said equipment surfaces substantially resistant to electroless copper deposition;

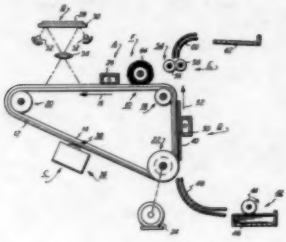
(2) electroless depositing copper on said substrate from said electroless copper solution; and

(3) while electrolessly depositing copper on said substrate, adjusting said more positive electrical potential to maintain said more positive electrical potential sufficiently positive to resist electroless copper deposition.

## 4,391,842
## METHOD OF DEVELOPMENT

Raymond W. Huggins, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 86,624, Oct. 19, 1979, abandoned. This application Jul. 27, 1981, Ser. No. 286,915
Int. Cl.³ B05D 1/04, 1/06
U.S. Cl. 427—14.1 5 Claims



1. A method of developing a latent image recorded on an image bearing member with an electrically conductive developer material, including the steps of:

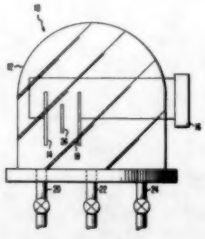
transporting the electrically conductive developer material into contact with the image bearing member in a development zone on a rotating tubular member by generating a magnetic field to attract the developer material to the tubular member; and

increasing the intensity of the magnetic field between the image bearing member and the tubular member to apply a selected pressure to the developer material to adjust the electrical conductivity of the developer material to enhance solid area latent image development, or decreasing the intensity of the magnetic field between the image bearing member and the tubular member to apply a selected pressure to the developer material to adjust the electrical conductivity of the developer material to enhance line latent image development.

## 4,391,843
## ADHERENT PERFLUORINATED LAYERS

Grzegorz Kaganowicz, Princeton, N.J., and John W. Robinson, Levittown, Pa., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 14, 1981, Ser. No. 292,905
Int. Cl.³ B05D 3/04, 3/14
U.S. Cl. 427—41 8 Claims



1. In a method for forming a perfluorinated film comprising the step of depositing a polymeric film on a substrate surface by subjecting the surface to a glow discharge in the presence of a precursor comprising a compound selected from the group consisting of perfluorocycloalkanes, perfluorocycloolefins and perfluoroalkyl-substituted derivatives thereof;

the improvement which comprises the additional step of exposing the substrate surface to a glow discharge of a gas consisting essentially of nitrogen prior to the depositing step.

## 4,391,844
## METHOD FOR MAKING LININGS AND COATINGS FROM SOLUBLE CROSS-LINKABLE PERFLUOROCARBON COPOLYMERS

Stanley K. Baczek; G. Howard McCain, both of Painesville; Leo L. Benezra, Mentor, and Michael J. Covitch, Cleveland Heights, all of Ohio, assignors to Diamond Shamrock Corporation, Dallas, Tex.

Filed Jun. 26, 1981, Ser. No. 277,920
Int. Cl.³ B05D 3/06, 3/02
U.S. Cl. 427—44 12 Claims

1. A method for coating a substrate with a soluabilized cross-linkable perfluorocarbon copolymer having pendant sulfonyl halide functional groups and polymerized from at least two monomers, one such monomer consisting essentially of at least one fluorinated vinyl compound and the other monomer consisting essentially of at least one monomer having the structure:

$$CF_2{=}CFA,\ CF_2{=}CFR_1A,\ CF_2{=}CFOR_1A$$

with $R_1$ being a bifunctional perfluorinated radical having between 2 and 25 carbon atoms, which carbon atoms being at least once interruptable by one or more oxygen atoms and A being one of sulfonyl fluoride and sulfonyl chloride comprising the steps of:

dispersing the copolymeric perfluorocarbon in a solvating dispersion media selected from a group consisting of Halocarbon Oil, perfluorooctanic acid, perfluorodecanoic acid, perfluorotributyl amine, perfluoro-1-methyldecalin, decafluorobiphenyl, pentafluorophenol and pentafluorobenzoic acid, heating the dispersion to a temperature between about 200° C. and 275° C. whereby substantially all perfluorocarbon copolymer solvates;

applying the admixed dispersions to the substrate;

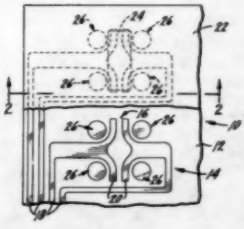
irradiating the applied copolymer to initiate cross-linking; and

removing the dispersion media using at least one of heat and vacuum.

## 4,391,845
## METHOD OF MAKING A MEMBRANE SWITCH

Ronald S. Denley, Woodstock, Ill., assignor to Oak Industries Inc., Rancho Bernardo, Calif.

Filed Nov. 19, 1981, Ser. No. 323,023
Int. Cl.³ H01H 11/06
U.S. Cl. 427—58 4 Claims



1. In a method of making a component of a membrane switch in a multiple-pass screen printing process, the membrane switch being of the type having a substrate, a flexible membrane, a first set of electrical conductors on the substrate, a second set of electrical conductors on the membrane, the conductor sets including a plurality of switch sites in facing relation, and spacer means normally holding the conductor sets

in spaced, non-contacting relation, the spacer means including a plurality of spacer areas on either the membrane or substrate at locations remote from the first and second sets of electrical conductors, the improved method comprising the steps of:

(a) forming one of the sets of conductors by screening a conductive material on the substrate or membrane in a first screening pass;

(b) forming a first layer of the spacer areas from the conductive material during the first screening pass;

(c) forming additional layers of the spacer areas by subsequent screening passes which deposit material only on the spacer areas so that the spacer means thickness is greater than that of the conductors.

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**4,391,846**

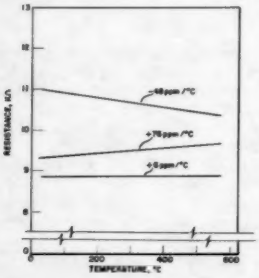
**METHOD OF PREPARING HIGH-TEMPERATURE-STABLE THIN-FILM RESISTORS**

**Leonard S. Raymond, Tucson, Ariz., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Continuation-in-part of Ser. No. 27,439, Apr. 5, 1979, abandoned. This application Nov. 12, 1980, Ser. No. 206,409**

**Int. Cl.³ C23C *11/08***

**U.S. Cl. 427—99** **9 Claims**




1. A chemical vapor deposition method for the preparation of high temperature stable thin film resistors having a predetermined temperature coefficient of resistance (TCR) and bulk resistivity comprising:

placing a substrate having an electrically insulative surface in a reactor;

flowing a reducing carrier gas through the reactor at a pressure of about 0.1 to 10 Torr to remove the ambient gas;

heating the substrate to a controlled temperature between 500° C. and 900° C.;

introducing a reactant gas into the flowing carrier gas, the reactant gas comprising a mixture of at least one decomposable compound of tungsten and at least one decomposable compound of silicon in a controlled ratio; and

contacting the flowing reactor and carrier gases with the heated surface of the substrate to decompose the reactant gas to deposit a thin film of tungsten silicide on the substrate, the controlled ratio of tungsten to silicon in the reactant gas being in part determinative of the tungsten to silicon ratio in the thin film which is determinative of the bulk resistivity and TCR of the film, and the controlled temperature of the substrate being determinative of the crystallinity of the film which is determinative of the TCR of the film, whereby for a tungsten to silicon ratio in the range of 1:3 to 3:1 a low substrate temperature will produce an essentially amorphous film having a TCR nearly equal to 0 ppm/°C. and increasing the substrate temperature will produce a more crystalline film having a more positive TCR, and whereby for tungsten to silicon ratios outside the limits of 1:3 to 3:1 the tungsten to silicon ratio will also affect the value of the TCR.

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**4,391,847**

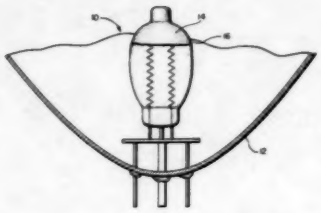
**COATING FOR HALOGEN LAMPS**

**Rollin G. Brown, Chesterfield, Mo., assignor to Edison International, Inc., Rolling Meadows, Ill.**

**Filed Oct. 19, 1981, Ser. No. 312,614**

**Int. Cl.³ C03C *17/23*; H01K *1/32***

**U.S. Cl. 427—106** **12 Claims**



1. A composition for coating the bulb surface of an incandescent lamp, said composition including;

(a) sodium silicate, said sodium silicate comprising silicon dioxide and sodium oxide in proportion by weight of approximately 2:1 and

(b) manganese dioxide, said manganese dioxide being finely divided and in proportion by weight with respect to said sodium silicate in the range between approximately 4:1 and approximately 5:1.

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**4,391,848**

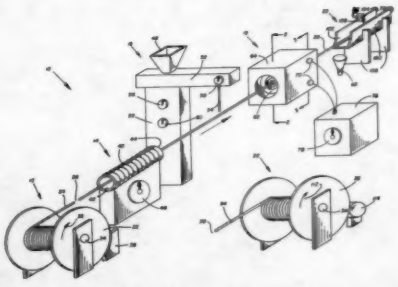
**METHOD FOR MANUFACTURING MAGNET WIRE**

**George D. Hilker, Fort Wayne, Ind., assignor to Phelps Dodge Industries, Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 931,314, Aug. 7, 1978. This application Apr. 20, 1981, Ser. No. 255,874**

**Int. Cl.³ B05D *5/12***

**U.S. Cl. 427—118** **25 Claims**



1. A method of manufacturing magnet wire or the like in which a flowable but hardenable material is applied to an elongated filament to a desired thickness in a single pass whereby the filament may be drawn, or otherwise formed, coated and spooled in a continuous operation comprising the steps of:

a. applying flowable material including less than about 5% weight solvent on said filament;

b. passing said filament through a stationary die at a speed of at least about 100 feet per minute, said die having a throat portion, an entrance opening larger than said throat portion interconnected by a converging interior wall thereby defining a die cavity between said throat portion and said

opening and said filament and said wall, said filament in said throat portion and die cavity being spaced from said die;

c. at least partially filling said die cavity with said material at a temperature above the melting point thereof;

d. centering said filament in said throat portion solely with said material in said die cavity;

e. wiping the excess of said flowable material from said filament leaving an essentially concentric coat of said material on said filament of a thickness meeting the requirements of ANSI/NEMA Standards Publication No. MW1000-1977.

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**4,391,849**

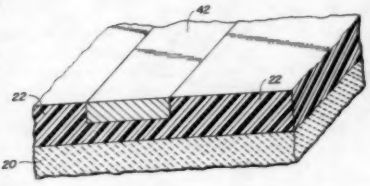
## METAL OXIDE PATTERNS WITH PLANAR SURFACE

**Peter G. Bischoff, Cupertino, Calif., assignor to Memorex Corporation, Santa Clara, Calif.**

**Filed Apr. 12, 1982, Ser. No. 367,366**

**Int. Cl.³ H01L** *21/308*

**U.S. Cl. 427—129** **7 Claims**




1. A method of fabricating a magnetic metallic pattern on a substrate adapted for use with thin film recording heads comprising the steps of:

a. forming a continuous, non-conductive, non-magnetic layer of a first material on said substrate;

b. forming a continuous layer of a second material on said first material layer, said second material being an anodizable metal selected to be insoluable in an etchant of said first material;

c. forming a photoresist layer on said second material layer in a negative pattern with respect to the desired metallic pattern;

d. removing the exposed areas of said second material to expose said first material;

e. plasma etching the exposed areas of said first material to define a cavity having relatively vertical side walls;

f. removing any remaining portions of said second material layer;

g. depositing a layer of said second material on said first material layer such that the thickness of said second material on the vertical side walls of said cavity is less than the thickness of the remainder of said second material layer;

h. soft anodizing said second material layer to a depth sufficient to anodize the portions of said second material formed on said vertical side walls;

i. dissolving the soft anodized portions of said second material such that the portions of said second layer formed on said side walls of said cavity are fully removed thereby electrically isolating the portions of said second material at the bottom of said cavity from the remaining portions of said second material located on the top of said first material;

j. hard anodizing the exposed surface of said portions of said second material located on the top of said first material;

k. removing the portion of said second material remaining in the bottom of said cavity;

l. forming a continuous layer of said magnetic metallic material by sputtering such that said cavity is filled, and a relatively thin layer of said metallic material is defined adjacent the top edges of said cavity;

m. removing the upper surface of said magnetic metallic material to a depth sufficient to expose said second material adjacent the top edges of the cavity; and

n. dissolving said second material such that said magnetic metallic material deposited directly thereon is released from said first material whereby a metallic pattern having vertical side walls is formed in said cavity, with the top surface thereof being co-planar with the top surface of the remaining first material.

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**4,391,850**

## RECORD MATERIAL CARRYING A COLOR DEVELOPER COMPOSITION

**Kenneth J. Shanton, Beaconsfield, England, assignor to The Wiggins Teape Group Limited, England**

**Filed Jun. 11, 1981, Ser. No. 272,719**

**Claims priority, application United Kingdom, Jun. 13, 1980, 8019369**

**Int. Cl.³ B41M** *5/16, 5/18, 5/22*

**U.S. Cl. 427—150** **8 Claims**

1. A process for the production of record material carrying a particulate amorphous hydrated silica/hydrated alumina composite comprising:

(a) preparing an aqueous mixture comprising dispersed, precipitated hydrated silica and an aluminum salt;

(b) precipitating hydrated alumina from the aqueous mixture in the presence of the dispersed, precipitated hydrated silica thereby yielding an amorphous hydrated silica/hydrated alumina composite having a mean alumina content of at least 7.5% on a dry weight basis of the total weight of silica and alumina wherein the hydrated alumina is proportionally greater in the surface region of the composite and wherein the surface area of the composite is less than 300 $m^2g^{-1}$;

(c) applying a coating composition incorporating said composite to a substrate; and

(d) drying the coated substrate to produce record material.

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**4,391,851**

## PROCESS FOR PRODUCING A MAGNETIC RECORDING MEDIUM

**Yasuyuki Yamada; Goro Akashi; Nobuo Tsuji; Yoshito Mukaida, and Masaaki Fujiyama, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Mar. 2, 1982, Ser. No. 353,791**

**Claims priority, application Japan, Mar. 2, 1981, 56-29741**

**Int. Cl.³ H01F** *10/02*

**U.S. Cl. 427—130** **21 Claims**

1. A process for producing a magnetic recording medium, comprising the steps of:

providing a non-magnetic support base;

coating a surface of said base with a magnetic coating solution comprising:

fine ferromagnetic particles;

a binder comprising nitrocellulose, polyol and an isocyanate having at least two isocyanato groups; and

a solvent;

evaporating said solvent until said magnetic layer coated on said base is comprised of 0.3 to 3 wt.% of the residual solvent;

calendering said base; and

drying the calendered base.

## 4,391,852
## PROCESS FOR PREPARING AN ACCEPTOR COATED SHEET

Mikio Nakamura, and Makoto Miyake, both of Hyogo, Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan

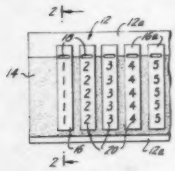
Filed Mar. 9, 1982, Ser. No. 356,532
Claims priority, application Japan, Mar. 19, 1981, 56-40893
Int. Cl.³ B41M 3/12
U.S. Cl. 427—150 4 Claims

1. In a process for preparing an acceptor coated sheet used in a pressure sensitive copying system utilizing a color forming reaction on a base sheet between the color former in the form of the oily core material encapsulated in microcapsules and the acceptor in an acceptor layer formed on said base sheet, the improvement which comprises coating said base sheet with a composition comprising at least one acceptor and an aqueous emulsion of an oligomer of a hydrocarbon compound having 3 to 10 carbon atoms in total and selected from the group consisting of liquid polypropylene, polybutadiene, polybutene, polyisobutylene, polyisoprene, polypentadiene, polyhexadiene, oligostyrene, isobutylene-isoprene copolymer, butene-butadiene copolymer, butene-isobutylene copolymer, and mixtures thereof, said oligimer being liquid at the normal temperature.

## 4,391,853
## METHODS OF MAKING ADHESIVE ARTICLES AND RESULTING PRODUCTS

David W. Pointon, Sparks, Nev., assignor to The Datak Corporation, Guttenberg, N.J.

Filed Dec. 10, 1979, Ser. No. 101,782
Int. Cl.³ B41M 3/12; B44C 1/16
U.S. Cl. 427—152 48 Claims



1. A method of producing an adhesive product including the steps of providing plural layers on a release surface of a carrier sheet, one of said layers being initially a non-tacky precursor of a pressure-sensitive adhesive, and another of said layers being in contact with the adhesive precursor layer in a common area extending over only part of said release surface and forming a non-tacky coherent polymeric film containing a migratory tackifier for the adhesive precursor layer, said tackifier being initially present in an amount sufficient to convert the adhesive precursor layer into a tacky pressure-sensitive adhesive layer in situ by migration to equilibrium of such amount of the tackifier into so much of the adhesive precursor layer as occupies said common area, the release surface of the carrier sheet being of the kind which, when a pressure-sensitive adhesive layer is formed thereon, forms a bond thereto that is readily peelable without the assistance of solvents or heat, and which, when a coherent polymeric film is formed thereon, forms only a weak bond thereto that is readily releasable without the assistance of heat or solvents.

## 4,391,854
## METHOD OF MAKING A BEARING MATERIAL CONTAINING AN ALUMINUM BASE ALLOY

Yoshitsugu Kanda; Minoru Kurikawa; Toru Morimoto, and Kiyoshi Nakanishi, all of Narashino, Japan, assignors to N.D.C. Co., Ltd., Chiba, Japan

Continuation of Ser. No. 147,654, May 7, 1980, abandoned. This application Oct. 16, 1981, Ser. No. 312,026
Int. Cl.³ B05D 3/12, 3/02
U.S. Cl. 427—192 2 Claims

1. A method of making an aluminum base alloy bearing material, comprising the steps of:

(a) washing one surface of a continuously fed steel strip or stainless steel strip;

(b) grinding the resulting washed surface of the strip;

(c) spreading on the resulting ground surface of the strip an aluminum base alloy powder containing from 6.8 to 9.2 wt % lead and from 0.8 to 1.5 wt % tin, to form an aluminum base alloy powder on the surface of the strip;

(d) preheating the strip having the aluminum base alloy powder thereon by the application of heat to the other surface of the strip to a temperature in the range of from 200° C. to 400° C., in an air atmosphere, without directly heating the aluminum base alloy;

(e) hot-rolling the preheated strip and the aluminum base alloy in the air atmosphere between a pair of heated rolls, each heated up to from 150° C. to 400° C. over the entire area of the surface thereof, to thereby pressure-bond the aluminum base alloy powder to the strip to form thereon a bearing surface layer;

(f) taking up the resulting bearing steel strip into a coil; and

(g) heating the coil in a furnace to sinter the coating at a temperature of from 250° C. to 500° C.

## 4,391,855
## CORROSION RESISTANT COATING AND METHOD FOR COATING METAL SUBSTRATE

Thurlow Geeck, Hillsdale, Mich., assignor to Depor Industries, Troy, Mich.

Continuation of Ser. No. 180,900, Aug. 25, 1980, abandoned. This application Apr. 29, 1982, Ser. No. 372,980
Int. Cl.³ B05D 3/02
U.S. Cl. 427—383.7 19 Claims

11. A method of protecting a metal substrate from corrosion comprising: applying to at least a portion of the surface of the substrate a thin and wet film of a liquid composition comprising powdered metal selected from the group consisting essentially of zinc, cadmium, stainless steel, aluminum, and alloys and blends thereof; said powdered metal having an average particle size not greater than about 40 microns and a maximum particle size not greater than about 100 microns; a resin system at least 80% by weight consisting essentially of a thermoplastic linear phenoxy resin having a high molecular weight in the range of about 3,000 to 60,000 and essentially no highly reactive terminal epoxy groups, the balance of said resin system consisting essentially of formaldehyde, melamine, phenolic, and triazine resins and blends thereof; the quantity of said resin system being about 10% to 525% by weight of said powdered metal; active organic solvent selected from the group consisting essentially of acetone, cellosolve acetate, methyl ethyl ketone, methyl isobutyl ketone, dimethylformamide, and blends thereof; inactive organic solvent selected from the group consisting essentially of aromatic hydrocarbons, alcohols, and blends thereof in a quantity equal to about 0.1 to 0.4

by weight of said active organic solvent; the total quantity of said organic solvents being sufficient for the composition to have a viscosity in the range of about 20 to 280 seconds with a Ford No. 4 cup; and heating the thin wet film to an elevated temperature for a sufficient period of time to evaporate the solvents and thereby tenaciously adhere the film to the substrate as a coating protecting the substrate from corrosion without heating any portion of the substrate to a temperature greater than 450° F.

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**4,391,856**

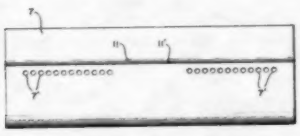
## ADHESIVE APPLICATOR AND METHOD FOR CIGARETTE-TO-FILTER ADHESION AND SIMILAR APPLICATIONS

**Donald B. McIntyre, and Frederic S. McIntyre, both of Wellesley, Mass., assignors to Acumeter Laboratories, Inc., Marlborough, Mass.**

**Division of Ser. No. 69,972, Aug. 27, 1979, abandoned. This application Oct. 20, 1980, Ser. No. 198,616**

**Int. Cl.³ B05D** *1/26*

**U.S. Cl. 427—358** **1 Claim**



1. A method of fluid adhesive application, that comprises, depositing at a predetermined region a plurality of inline closely transversely spaced, non-overlapping parallel beads of such adhesive upon a web while drawing the web longitudinally through said region; deflecting the parallel-bead-coated web upward at an acute angle over an edge just beyond the region of bead deposition; and controlling the size of the beads and degree of upward deflection relative to the speed of drawing of the web to shear the beads at said edge and merge the same into a uniform, continuous, full adhesive coating transversely across said web.

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**4,391,857**

## AQUEOUS DISPERSION TYPE COATING COMPOSITIONS WITH AN IMPROVED VIBRATION-DAMPING CHARACTERISTIC

**Koichi Saito, and Osamu Ohara, both of Kurashiki, Japan, assignors to Kuraray Company, Limited, Kurashiki, Japan**

**Continuation of Ser. No. 178,592, Aug. 15, 1980, Pat. No. 4,325,858. This application Sep. 24, 1981, Ser. No. 305,224**

**Claims priority, application Japan, Aug. 16, 1979, 54-104708**

**The portion of the term of this patent subsequent to Apr. 20, 1999, has been disclaimed.**

**Int. Cl.³ B05D** *3/02*

**U.S. Cl. 427—385.5** **6 Claims**

1. A method of damping the vibration of a structural member comprising (1) coating a surface of said structural member with a layer of an aqueous dispersion comprising, as essential components thereof, (a) a polyvinyl acetate emulsion, (b) an ethylene polymer in finely divided particulate or emulsion state, and (c) a flaky inorganic filler, and (2) then drying the coated layer.

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**4,391,858**

## COATING PROCESS

**Wolfgang Batzill, Münster, Fed. Rep. of Germany, assignor to Glasurit America, Inc., Detroit, Mich.**

**Filed Nov. 20, 1981, Ser. No. 323,367**

**Int. Cl.³ B05D** *1/36*

**U.S. Cl. 427—407.1** **13 Claims**

1. A process for the production of a multilayer protective and/or decorative coating upon the surface of a substrate, which comprises the steps of:

(1) applying to the surface a basecoat composition comprising:

(A) a film-forming polymer;

(B) a volatile organic liquid diluent in which the polymer is dissolved;

(C) polymer microparticles of diameter 0.01 to 10 microns which are insoluble in the solution of the polymer (A) in the liquid diluent (B) and are stably dispersed by steric stabilization therein in a nonflocculated state in an amount of from 3% to 8% of the aggregate weight of said film-forming polymer of (A) and said microparticles;

(D) pigment particles also dispersed in the solution of the film-forming polymer in the liquid diluent;

(2 ) forming a polymer film upon the surface from the composition applied in step (1);

(3) applying to the basecoat film so obtained a transparent topcoat composition comprising:

(E) a film-forming polymer; and

(F) a volatile carrier liquid for the polymer; and

(4) forming a second polymer film upon the basecoat film from the composition applied in step (1).

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**4,391,859**

## PROCESS AND A COMPOSITION FOR THE INSULATION OF SURFACES, AND PRODUCT HEREBY OBTAINED

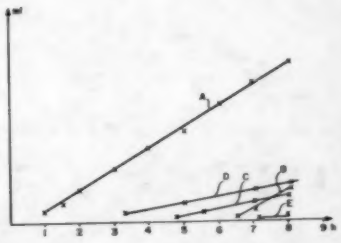
**Ernst R. Fogelberg, Vällingby, Sweden, assignor to AB Bonierföretagen, Stockholm, Sweden**

**Continuation of Ser. No. 242,688, Mar. 11, 1981, which is a continuation of Ser. No. 800,200, May 25, 1977, which is a continuation of Ser. No. 593,661, Jul. 7, 1975, abandoned. This application Dec. 21, 1981, Ser. No. 332,679**

**Claims priority, application Sweden, Jul. 10, 1974, 7409097**

**Int. Cl.³ B05D** *1/02, 1/12*

**U.S. Cl. 427—421** **8 Claims**

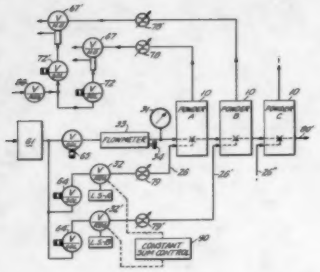



1. A process for minimizing accumulation of moisture on a cold surface exposed to humidity conditions which tend to cause condensation on said surface, which comprises feeding to the nozzle of a spray head a premixed sprayable coating composition containing a binder dispersed in a liquid vehicle having distributed therein water-absorptive granules of heat-expanded perlite having a bulk density of about 60–70 kgs/m$^3$, said composition being characterized in that the water-absorptive character of said granules is not occluded, in that said binder is either soluble in or physically-dispersible in said liquid vehicle, and in that it dries to an adherent, water-absorptive, insulating coating, and spray-coating said surface for the purpose of minimizing the collection of condensation on said surface with a thin layer of said composition to form said adherent water-absorptive, insulating coating, said granules having a particle size of about 0.01 to about 1.5 mm, being pretreated with a wetting agent, and constituting from 5 to 20 percent by weight of the composition.

## 4,391,860
## DEVICE FOR THE CONTROLLED FEEDING OF POWDER MATERIAL

Anthony J. Rotolico, Hauppauge; Eduardo Romero, Coram, and John E. Lyons, Levittown, all of N.Y., assignors to Eutectic Corporation, Flushing, N.Y.

Continuation-in-part of Ser. No. 226,756, Jan. 21, 1981. This application Feb. 23, 1981, Ser. No. 237,092
Int. Cl.³ B05D 1/08; B05B 7/14, 7/20
U.S. Cl. 427—423 17 Claims

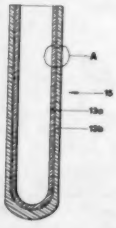


1. The method of supplying powder to a powder-deposition torch, which comprises selecting two powder-fluidizing systems each having the ability to selectively control the rate of its powder assimilation in a flow of carrier gas therethrough, supplying different gas-fluidizable powders to the respective systems, increasing the rate of powder assimilation in carrier-gas flow through one of said systems while decreasing the rate of powder assimilation in the carrier-gas flow through the other of said systems, combining the carrier-gas flows after powder-assimilation therein, and delivering the combined flow to the torch, the same carrier-gas flow being passed through the respective systems in succession, whereby the combining step occurs at passage of the carrier-gas flow through the second system.

## 4,391,861
## PREFORM OF A THERMOPLASTIC

Claes T. Nilsson, Löddeköpinge, Sweden, assignor to PLM AB, Malmo, Sweden

Filed May 18, 1981, Ser. No. 264,424
Claims priority, application Sweden, May 29, 1980, 8004003; Dec. 10, 1980, 8008653
Int. Cl.³ B65D 11/16; B29F 1/10; B32B 9/04
U.S. Cl. 428—35 10 Claims



1. An expandable preform assembly capable of being blow molded to a container, said assembly comprising inner and outer distinct, interfitted part-preforms of tubular shape with opposite open and closed ends, each of said part-preforms being constituted of a thermoplastic material capable upon molding of being joined to the other part-preform to form a container having inner and outer layers respectively conforming to said part-preforms, at least one of said interfitted part-preforms being axially stretched, prior to molding, to provide crystallinity obtained by monoaxial orientation.

## 4,391,862
## PASTEURIZABLE THERMOPLASTIC FILM AND RECEPTACLE THEREFROM

Norman D. Bornstein, Spartanburg, and Johnnie J. Walters, Greenville, both of S.C., assignors to W. R. Grace & Co., Cryovac Division, New York, N.Y.

Continuation-in-part of Ser. No. 279,904, Jul. 2, 1981, abandoned. This application Sep. 15, 1981, Ser. No. 302,333
Int. Cl.³ B65D 85/72, 65/40; B32B 27/32
U.S. Cl. 428—35 15 Claims

1. A multi-layer, heat shrinkable, thermoplastic packaging film which will produce heat selas having improved seal strength immediately after initially being heat sealed to itself comprising:

(a) a first or surface layer consisting essentially of a blend wherein one constituent of the blend is selected from the group consisting of propylene homopolymers and copolymers and the other constituent of the blend is selected from the group consisting of butene-1 homopolymers and copolymers;

(b) a second layer comprising a polymer selected from the group consisting of ethylene homoplymers and copolymers, said layer being heat shrinkable;

(c) a third or low gas transmission layer comprising a polymer selected from the group consisting of vinylidene chloride copolymers and hydrolyzed ethylene-vinyl acetate copolymers; and,

(d) a fourth or outer surface layer comprising a blend selected from the group of blends as specified for the first layer.

8. A process for making a multi-layer, heat shrinkable, thermoplastic packaging film which will produce heat seals having improved seal strength immediately after being heat sealed to itself comprising the steps of:

(a) coextruding first and second polymeric layers, the first layer consisting essentially of a blend selected from the group consisting of (1) propylene homopolymers and copolymers and (2) butene-1 polymers and copolymers and the second layer comprising a polymer selected from the group consisting of ethylene polymers and copolymers;

(b) irradiating said coextruded layers to a dosage level of at least 2 MR; and,

(c) after the irradiation step has been completed, joining a third layer of polymeric material to the second layer and a fourth layer to the third layer.

## 4,391,863
## PEEL RESISTANT COEXTRUDED SHEET

Laszlo J. Bonis, Swampscott, Mass., assignor to Composite Container Corporation, Medford, Mass.

Filed Oct. 23, 1981, Ser. No. 314,120
Int. Cl.³ B65D 1/34
U.S. Cl. 428—35 11 Claims

1. A coextruded sheet comprising

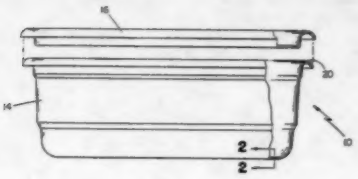
a layer made of acrylonitrile-methyl acrylate copolymer to provide a gas barrier, rigidity, thermoformability, and printability,

a structural layer made of polyolefin to provide a moisture barrier and chemical resistance, and

an intermediate tie layer made of a radial butadiene/styrene teleblock copolymer having between 60 and 80% butadiene and between 20 and 40% styrene,

whereby said tie layer provides a strong bond between said

acrylonitrile methyl-acrylate layer and said polyolefin layer notwithstanding the difference in shrinkage between




said acrylonitrile methyl-acrylate layer and said polyolefin layer.

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**4,391,864**

**MAGNETIC RECORDING MEDIUM**

**Akihiko Hosaka; Kiyotaka Okuyama, and Yukihiro Isobe, all of Tokyo, Japan, assignors to TDK Electronics Co., Ltd., Tokyo, Japan**

**Filed Dec. 9, 1980, Ser. No. 214,677**
**Claims priority, application Japan, Mar. 21, 1980, 55-35947**
**Int. Cl.³ G11B** *5/70*
**U.S. Cl. 428—64** **5 Claims**

1. A magnetic recording medium having a substrate coated with a magnetic layer which comprises a binder and a magnetic powder, said binder in the magnetic layer comprising 40 to 70 wt. % of a urethane resin, 15 to 40 wt. % of a thermosetting epoxy resin characterized by its content of epoxide groups, and 10 to 40 wt. % of a thermoplastic phenoxy resin characterized by its content of polyhydroxyether groups.

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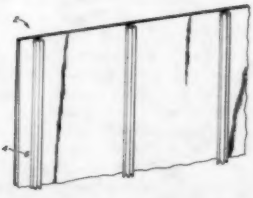
**4,391,865**

**THERMAL DRAPERY CONSTRUCTION**

**Lillie B. Constance, 753 East St., Woodland, Calif. 95695**

**Filed Oct. 5, 1981, Ser. No. 308,626**
**Int. Cl.³ B32B** *15/14, 5/22*
**U.S. Cl. 428—74** **9 Claims**



1. A thermal drapery construction suitable for use in making hung draperies comprising:

a decorative flexible drapery fabric; and

a flexible liner assembly means, attached to said drapery fabric, for thermally lining said drapery fabric comprising:

a first fabric panel having a first metalized surface facing an inside direction and a second surface facing an outside direction;

a second fabric panel disposed adjacent the first panel and having a first metalized surface facing the outside direction and a second surface facing the inside direction and the second surface of the first panel;

a third relatively thick, low density flexible panel situated between the second surfaces of the first and second panels, said third panel having a low density to form a dead air space between said first and second panels;

said first, second and third panels having aligned outer edges; and

means for binding the aligned outer edges of said first, second and third panels.

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**4,391,866**

**CUT PILE FABRIC WITH TEXTURIZED LOOPS**

**Robert C. Pickens, Jr., Gurnee; Reese R. Thomas, Libertyville, and Ronald Somerville, Gurnee, all of Ill., assignors to Ozite Corporation, Libertyville, Ill.**

**Continuation of Ser. No. 159,470, Jun. 16, 1980, abandoned. This application Dec. 9, 1981, Ser. No. 328,970**
**Int. Cl.³ B32B** *3/02, 33/00*
**U.S. Cl. 428—92** **12 Claims**

1. A cut pile fabric comprising:

a needled batt of non-woven staple fibers,

texturized loops of stable fibers formed from the staple fibers of said batt extend outwardly from one surface of the batt,

the texturized loops of fibers are comprised of a plurality of clusters of loops of fibers with each cluster containing a plurality of different sized loops of fibers,

backing means on another surface of said batt for securing fibers of said texturized loops to the fibers of said batt,

a substantial portion of the fibers of said texturized loops being cut to form cut pile, and

said cut pile being polished and sheared to provide a fabric with a plush cut pile.

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**4,391,867**

**POLYVINYL BUTYRAL INK FORMULATION**

**Burton N. Derick, Mineralwells, W. Va.; Robert E. Moynihan, Lowell, Ohio, and Jon W. Wolfe, Matthews, N.C., assignors to E. I. Du Pont de Nemours & Co., Wilmington, Del.**

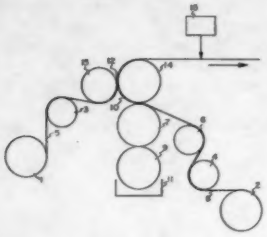
**Division of Ser. No. 861,568, Dec. 16, 1977, Pat. No. 4,230,775. This application Feb. 8, 1980, Ser. No. 119,790**
**Int. Cl.³ B32B** *3/00, 27/14*
**U.S. Cl. 428—195** **2 Claims**

1. In a polyvinyl butyral sheet printed with an ink comprising solvent, dye and unplasticized polyvinyl butyral, the improvement wherein the unplasticized polyvinyl butyral in the ink has a hydroxyl content about from 5 to 50 percent higher than the hydroxyl content of the polyvinyl butyral sheeting.

## 4,391,868
## LAMINATION OF POLYVINYL CHLORIDE CAST FILMS

Harold J. McCarthy, Jr., Mohrsville, Pa., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 13, 1981, Ser. No. 310,570
Int. Cl.³ B32B 7/02, 27/30
U.S. Cl. 428—215 3 Claims



1. A laminated rigid vinyl chloride homopolymer comprising two solution cast films each having a thickness of 0.00762 centimeter and being adhered together with an actinic light activatable adhesive to give a thickness of essentially 0.01524 centimeter.

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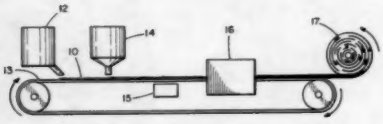
## 4,391,869
## NONWOVEN FIBROUS PRODUCT

John R. Cook, Downers Grove, and William A. James, Tinley Park, both of Ill., assignors to Johnson & Johnson Baby Products Company, New Brunswick, N.J.

Filed Oct. 6, 1980, Ser. No. 194,511
Int. Cl.³ B32B 7/02
U.S. Cl. 428—218 6 Claims



1. A low density, resin-bonded, nonwoven fabric consisting essentially of wet resilient, dry resilient, synthetic, staple fibers, the fabric having a density less than about 0.06 gm/cc at 0.16 lb/sq. in. load, and a weight less than about 3 oz/sq. yd.

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## 4,391,870
## SPRAY-SUPPRESSION DEVICE

Earle R. Ellis, Pensacola, Fla., assignor to Monsanto Company, St. Louis, Mo.

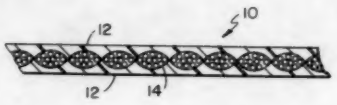
Filed Apr. 5, 1982, Ser. No. 365,342
Int. Cl.³ B32B 7/02
U.S. Cl. 428—218 10 Claims

1. A laminated spray-suppression device comprising a nonwoven polyamide fabric core layer encapsulated on each side with an adhesive layer, a backing layer of high density polyethylene fusion-bonded to one of the adhesive layers and a grass-like, three-dimensional layer of low density polyethylene or polypropylene fusion-bonded to the other adhesive layer.

## 4,391,871
## MEAT PACKAGING SHROUD

Jack S. Rogers, Spartanburg, and Kenneth H. Sanders, Jonesville, both of S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.

Filed Dec. 9, 1982, Ser. No. 448,306
Int. Cl.³ B32B 7/00
U.S. Cl. 428—219 7 Claims



1. A fabric particularly useful as a wrapping for foodstuffs, such as meat comprising: a layer of warp knit, weft inserted, synthetic fabric and a layer of wax coated to both sides of said layer, said warp knit fabric having a textured polyester continuous filament weft inserted yarn and a continuous filament chain stitch.

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## 4,391,872
## HOLLOW WATER-ABSORBING POLYESTER FILAMENT TEXTILE MATERIAL

Togi Suzuki; Kiyokazu Tsunawaki, both of Matsuyama; Osamu Wada, Takatsuki, and Akio Kimura, Ashiya, all of Japan, assignors to Teijin, Ltd., Osaka, Japan

Division of Ser. No. 171,335, Jul. 23, 1980, Pat. No. 4,361,617.
This application Jun. 11, 1982, Ser. No. 387,495
Claims priority, application Japan, Jul. 26, 1979, 54-94189; Sep. 11, 1979, 54-115730
Int. Cl.³ D03D 3/00
U.S. Cl. 428—224 24 Claims

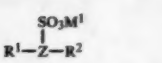
x 3000

1. A hollow water-absorbing polyester filament textile material, comprising hollow polyester filaments each having at least one hollow extending in parallel to the longitudinal axis of said filament, and a number of caves distributed in at least a portion of the body of said filament and consisting of a number of fine outside concaves formed in the peripheral surface of said filament, a number of fine pores formed within the body of said filament, a number of fine inside concaves formed in the hollow surface of said filament, and a number of fine channels through which said pores are connected to each other, and to said outside concaves and inside concaves, said outside and inside concaves and said pores extending approximately in parallel to the longitudinal axis of said filament, which textile material has been prepared by the process comprising the steps of:

(A) preparing core-in-sheath type composite filaments in each of which (1) a sheath constituent comprises a blend of (a) a principal polyester component comprising an acid moiety comprising at least one aromatic dicarboxylic acid or its ester-forming derivative and a glycol moiety comprising at least one alkylene glycol having 2 to 6 carbon atoms or its ester-forming derivative, with (b) a cave-

forming agent which comprises at least one member selected from the group consisting of

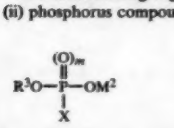
(i) copolyesters which comprise a glycol compound moiety, and an aromatic dicarboxylic acid compound moiety and an additional divalent organic sulfonic acid compound moiety of the formula (II):



(II)

wherein Z represents a member selected from the group consisting of trivalent aromatic hydrocarbon radicals and trivalent aliphatic hydrocarbon radicals, $M^1$ represents a member selected from the group consisting of hydrogen and metal atoms, $R^1$ represents an ester-forming organic radical, and $R^2$ represents a member selected from the group consisting of a hydrogen atom and ester-forming organic radicals;

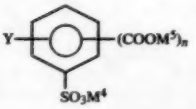
(ii) phosphorus compounds of the formula (III):



(III)

wherein $R^3$ represents a monovalent organic radical, X represents a member selected from the group consisting of —$OR^4$, wherein $R^4$ represents a hydrogen atom or a monovalent organic radical, —$OM^3$, wherein $M^3$ represents a metal atom, and a monovalent organic radical, $M^2$ represents a metal atom, and m represents zero or 1, and;

(iii) aromatic carboxy-sulfonic acid compounds of the formula (IV):



(IV)

wherein Y represents a member selected from the group consisting of a hydrogen atom and ester-forming organic radicals, $M^4$ represents a metal atom, $M^5$ represents a metal atom, and n represents an integer of 1 or 2, and (2) the core constituent consists of a polymeric material having a higher degree of alkali solubility than that of said sheath constituent;

(B) converting said core-in-sheath type composite filaments into a desired type of textile material; and

(C) removing at least a portion of said cave-forming agent, the entire core constituent, and a portion of said principal polyester component from said core-in-sheath type composite filaments in said textile material by treating it with an alkali aqueous solution.

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**4,391,873**

## HIGH TEMPERATURE THERMAL INSULATING COMPOSITE

**Gilbert W. Brassell, Golden, Colo., and John Lewis, Jr., Oak Ridge, Tenn., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.**

**Filed Jan. 19, 1982, Ser. No. 340,623**

**Int. Cl.³ B29C *25/00*; B32B *5/12*; C04B *29/00***

**U.S. Cl. 428—297** **7 Claims**

1. A composite comprising:

a first region extending inwardly from a first surface of said composite and comprising a carbonized polymeric binder, fibers formed of a refractory material, and a predetermined weight proportion of graphite flakes; and

a second region extending from said first region toward a second surface of said composite opposed to said first surface and comprising a carbonized polymeric binder, fibers formed of a refractory material, and graphite flakes the weight proportion of which gradually decreases as distance from said first surface increases.

7. A method for forming a thermal insulating composite, comprising:

depositing on a support a slurry comprising a mixture of a polymeric binder precursor, refractory fibers, and graphite flakes, the weight proportion of said graphite flakes in said slurry being varied as the slurry is deposited on said support;

polymerizing said polymeric binder precursor in said slurry deposited on said support; and

carbonizing the polymerized polymeric binder.

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**4,391,874**

## MAGNETIC RECORDING MEDIUM

**Nobuyuki Yamamoto; Kyoichi Naruo, and Tsutomu Okita, all of Fujinomiya, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Feb. 19, 1982, Ser. No. 350,510**

**Claims priority, application Japan, Feb. 19, 1981, 56-23520**

**Int. Cl.³ B32B *15/08*; H01F *10/00***

**U.S. Cl. 428—336** **12 Claims**

1. A magnetic recording medium, comprising:

a non-magnetic support base;

a thin magnetic metal film formed on a surface of said non-magnetic support base; and

a layer of an isocyanic acid ester having the formula RN=C=O, wherein R is an alkyl group.

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**4,391,875**

## ASBESTOS PRODUCTS OF IMPROVED PHYSICAL PROPERTIES HAVING METAL OXIDES ON THE SURFACES THEREOF

**Byeong H. Jo, Horsham, Pa., and Jerry Zucker, Charleston, S.C., assignors to RM Industrial Products Company, Inc., North Charleston, S.C.**

**Filed Dec. 11, 1980, Ser. No. 215,508**

**Int. Cl.³ C03B *37/00*; C04B *43/04*; D21H *3/66, 5/18***

**U.S. Cl. 428—378** **10 Claims**

1. An improved asbestos product, said product consisting essentially of asbestos fiber and a metal oxide coated on said fiber and in surface contact therewith, said metal oxide being selected from the group consisting of iron oxide and chromium oxide.

5. A method of improving the properties of products made from asbestos comprising the steps of dividing the asbestos into fibers, and providing a coating of a metal oxide directly onto the surface of said fibers, said metal oxide being selected from the group consisting of chromium oxide and iron oxide.

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**4,391,876**

## AQUEOUS PEROXIDE EMULSION FOR USE WITH GLASS FIBERS

**Albert E. Tamosauskas, Pittsburgh, and Chester S. Temple, McKees Rocks, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Apr. 2, 1980, Ser. No. 136,645**

**Int. Cl.³ B32B *9/00*; C08K *3/40***

**U.S. Cl. 428—392** **15 Claims**

1. An aqueous emulsion of an organic peroxide that is a liquid at about 20° C. and is insoluble or has limited solubility in water, wherein the emulsion has improved stability and dilutability and has an average particle size of around 1.5 microns or less, consisting essentially of:

(a) at least 1 to about 60 percent by weight of said liquid organic peroxide selected from the group consisting of

hydroperoxides, α-oxy and α-peroxy hydroperoxides, dialkyl peroxides, aldehyde and ketone peroxides, diacyl peroxides, peroxyesters, peroxy acids, peroxydicarbonates, peroxymonocarbonate and perketals,

(b) about 1 to about 15 weight percent of a nonionic emulsifier blend having three emulsifiers selected from the group consisting of polyalkylene glycol ethers, dialkylarylpolyether alcohols, and polyoxypropylene-polyoxyethylene condensates, phenoxypolyethoxyethanols, polyethylene derivatives of fatty acids, partial esters of sorbitol anhydrides; ethoxylated alcohols, fatty acids, fatty esters and oils, alkylphenols; glycerol esters, sucrose esters and derivatives, monoglycerides and derivatives, and sorbitan derivatives, polyethoxy phenols, alkyl polyether alcohols, ethylene oxide alkylated phenol condensation products, and mixtures thereof wherein one emulsifier has an HLB in the range of about 6 to about 12 and one emulsifier has an HLB in the range of about 9 to 15 and one emulsifier has an HLB in the range of about 12 to about 20 each in proportions to give an overall HLB level for the emulsifier system in the range of about 9 to about 20, and

(c) the remaining weight percent of the emulsion is water.

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**4,391,877**

## MAGNETIC RECORDING MEDIUM

**Fujio Shibata, Komoro; Hiroshi Kawahara, Saku, and Hitoshi Azegami, Nagano, all of Japan, assignors to TDK Electronics Co., Ltd., Tokyo, Japan**

**Filed Mar. 18, 1982, Ser. No. 359,421**

**Claims priority, application Japan, Mar. 23, 1981, 56-40464**

**Int. Cl.³ H01F *10/02***

**U.S. Cl. 428—457** **4 Claims**

1. A magnetic recording medium including a substrate having a magnetic coating layer thereon, said magnetic coating layer comprising ferromagnetic particles dispersed in a binder vehicle, characterized in that the magnetic coating layer contains one or more ketones selected from the compounds expressed by the general formula

$$R_1—\overset{\overset{O}{\|}}{C}—R_2,$$

wherein $R_1$ and $R_2$ represent saturated or unsaturated chain aliphatic radicals, both or either of which have 11 to 22 carbon atoms and may contain hydroxyl, carboxyl or amino groups.

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**4,391,878**

## WET STRENGTH RESINS

**John E. Drach, Montgomery County, Pa., assignor to Scott Paper Company, Philadelphia, Pa.**

**Filed Jul. 24, 1981, Ser. No. 286,078**

**Int. Cl.³ B32B *9/00*; C08F *222/02, 222/38***

**U.S. Cl. 428—479.6** **10 Claims**

1. A cellulosic fibrous web wherein the cellulose fibers are chemically modified by a cross-linking reaction with a wet strength resin comprising a water soluble copolymer comprised of (A) a half-acid, half-amide corresponding to the following general formula:

$$NH_2—\overset{\overset{O}{\|}}{C}—R—\overset{\overset{O}{\|}}{C}—OR^1$$

wherein R' is H and R is a hydrocarbon chain containing a double bond which has radically polymerized with (B) at least one other ethylenically unsaturated monomer.

**4,391,879**

## GRAVURE PRINTING BASE CYLINDER, AND METHOD OF ITS MANUFACTURE

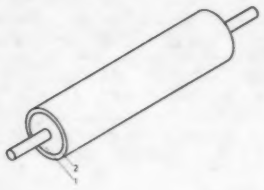
**Peter Fabian, Freigericht, Fed. Rep. of Germany, and Theo Muller, Wuustwezel, Belgium, assignors to W. C. Heraeus GmbH, Hanau, Fed. Rep. of Germany**

**Filed Dec. 2, 1981, Ser. No. 326,506**

**Claims priority, application Fed. Rep. of Germany, Dec. 12, 1980, 3046757**

**Int. Cl.³ B41F *13/08, 35/00***

**U.S. Cl. 428—551** **15 Claims**



1. Printing base cylinder, for plating in an electrolyte bath, having

a cylindrical body (1);

and a cover layer (2) thereon which is electrically conductive, electrochemically active, and inert with respect to the plating electrolyte,

wherein, in accordance with the invention,

the cover layer (2) comprises

a matrix formed by an oxide of a valve metal;

and particles homogeneously distributed in said matrix comprising at least one of the materials selected from the group consisting of:

a noble metal, iridium; ruthenium.

11. Method of making a gravure printing base cylinder for use in an electrolyte bath having

a cylinder body (1) and a cover layer (2) applied thereover, comprising the steps of

settling electrically conductive particles on a film-forming or valve metal oxide,

which particles are inert with respect to the electrolyte of the electrolyte bath, to form a cover coating layer substance;

and, after forming said substance, applying said substance in powder or granular form, by thermal spraying on the cylindrical body (1) to thereby form said cover layer (2) thereon.

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**4,391,880**

## RECOVERY OF HEAT AND VAPORIZED MATERIAL FROM A REACTION EFFLUENT

**Utah Tsao, Jersey City, N.J., assignor to The Lummus Company, Bloomfield, N.J.**

**Continuation-in-part of Ser. No. 48,147, Jun. 13, 1979, Pat. No. 4,243,650, which is a continuation-in-part of Ser. No. 870,351, Jan. 18, 1978, abandoned, and a continuation-in-part of Ser. No. 25,278, Mar. 29, 1979, abandoned. This application Jan. 2, 1981, Ser. No. 222,081**

**The portion of the term of this patent subsequent to Jan. 6, 1998, has been disclaimed.**

**Int. Cl.³ B01D *5/00*; C07C *120/14***

**U.S. Cl. 423—659** **4 Claims**

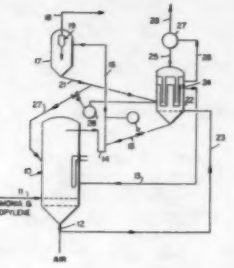
1. A process for cooling a gaseous reaction effluent containing volatized catalyst and withdrawn from a reaction system employing a solid catalyst, comprising:

contacting the gaseous reaction effluent with solid catalyst particles by suspending the solid catalyst particles in flowing gaseous reaction effluent to provide dilute phase transport contact, said solid catalyst particles being at a temperature at which vaporized catalyst condenses from the gas onto the solid catalyst particles, said solid catalyst parti-

cles being heated and said gaseous reaction effluent being cooled by said contact;

separating gaseous reaction effluent from the solid catalyst particles;

cooling separated solid catalyst particles in a fluidized bed, said fluidized bed being fluidized by a fluidizing gas, said



particles being cooled in the fluidized bed to a temperature at which vaporized salt condenses onto the solid particles, said fluidizing gas being a feed gas to the reaction system and being introduced into the reaction system subsequent to use thereof as the fluidizing gas; and

employing cooled solid catalyst particles for contacting the gaseous reaction effluent.

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**4,391,881**

## PHOTOGALVANIC CELL

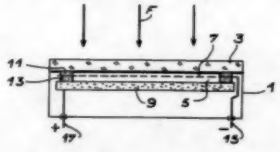
**Gerard Folcher, Orsay, and Jacques Paris, Bures sur Yvette, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France**

**Filed Jun. 17, 1981, Ser. No. 274,462**

**Claims priority, application France, Jun. 18, 1980, 80 13543**

**Int. Cl.³ H01M 6/36**

**U.S. Cl. 429—111** **8 Claims**



**1.** A photogalvanic cell comprising two electrodes arranged in a liquid system comprising a first photosensitive constituent, consisting of the uranyl ion $UO_2^{2+}$ and a second constituent $A_{red}$ able to reduce the uranyl ion $UO_2^{2+}$ when the latter is brought into an excited state $UO_2^{2+*}$ by the absorption of a photon and which can be transformed into an oxidized type $A_{ox}$, the second constitutent $A_{red}$ being such that the redox potential of $A_{red}/A_{ox}$ is below 2.6 V relative to the standard hydrogen electrode (SHE) wherein the second constituent is a cation having a redox potential higher than 1 V relative to the standard hydrogen electrode or an anion selected from the group consisting of $NO_3^-$ and $SCN^-$, and the liquid system comprises a solvent inert with respect to $UO_2^+$ and $A_{red}$.

**4,391,882**

## BATTERY CONNECTING DEVICE

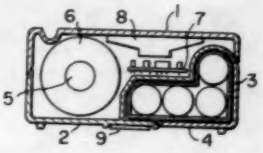
**Shigeto Saruwatari, Chigasaki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Filed Oct. 5, 1981, Ser. No. 308,940**

**Claims priority, application Japan, Oct. 8, 1980, 55/144521[U]**

**Int. Cl.³ H01M 2/20**

**U.S. Cl. 429—96** **4 Claims**



**1.** A battery connecting device comprising: at least a connection terminal constituted by a resilient strip-like member having one end soldered to a lead and the other end bent to form a retainer tab, the intermediate portion of said strip-like member being bent resiliently to form a contact portion of said connecting terminal; and a wall defining a battery accommodating space and having a first slit adapted to permit at least said retainer tab and said contact portion of said connection terminal to pass therethrough and a second slit adapted to permit at least said retainer tab to pass therethrough, said connection terminal being directly attached to said wall through said first and second slits in such a manner that said contact portion appears at the same side of said wall as the battery while said retainer tab and said end soldered to said lead appear at the opposite side of said wall to said battery and that a reactional force is generated to press said contact portion of said connecting terminal toward said battery.

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**4,391,883**

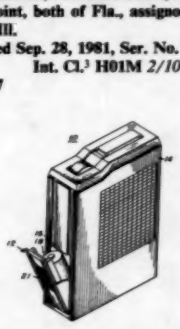
## HOUSING ARRANGEMENT WITH BREAKAWAY BATTERY ACCESS DOOR

**Richard D. Williamson, Fort Lauderdale, and George J. Selinko, Lighthouse Point, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Sep. 28, 1981, Ser. No. 306,575**

**Int. Cl.³ H01M 2/10**

**U.S. Cl. 429—97** **4 Claims**



**1.** An improved housing arrangement for housing electrical components and having a non-destructive, breakaway battery door, comprising in combination:

a housing having top, bottom, front, back and side walls, said housing including a cavity for accomodating an associated cylindrical battery with an opening along one side of said housing giving access to said battery cavity;

a battery door panel interfitting in said battery cavity opening;

breakaway hinge means with respective portions intercoupling the bottom of said door panel and said housing to permit said door to pivot outwardly at the top thereof,

said door when pivoted outwardly beyond a predetermined distance forcing disengagement of respective portions of said hinge means to non-destructively separate said door from said housing;

shoulder means mounted on said housing inside said battery cavity;

a cylindrical wing member integral to the interior side of said battery door panel into which a cylindrical battery is placed, said wing member including a door stop means which engages said shoulder means when said door panel is extended outwardly to a predetermined distance; and

latch means, integral with said battery door surface and operable in a lateral direction to releasably latch said battery door in said housing.

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**4,391,884**

## PROCESS FOR THE PRODUCTION OF A PHOTOGRAPHIC COLOR IMAGE BY THE SILVER DYE BLEACH PROCESS AND SUITABLE COLOR PHOTOGRAPHIC MATERIAL THEREFOR

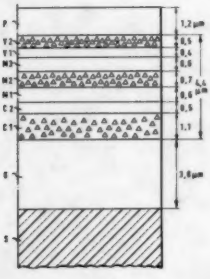
**Armin Meyer, Belfaux, and Carlo Boragine, Villars-sur-Glane, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland**

**Filed Apr. 17, 1981, Ser. No. 255,069**

**Claims priority, application Switzerland, Apr. 30, 1980, 3344/80**

**Int. Cl.³ G03C *7/00***

**U.S. Cl. 430—17** **14 Claims**



**1.** A process for the production of a photographic colour image by the silver dye bleach process, by exposure, silver developing, dye bleaching, silver bleaching and fixing, and using a photographic material which contains light-sensitive silver halide layers and dye layers on a base, which process comprises exposing image-wise a photographic material, which has at least one light-sensitive silver halide emulsion layer, which can contain a diffusion-resistant, bleachable image dye, and immediately above it, on the side facing the light source, a silver halide-free layer containing a diffusion-resistant bleachable image dye, the light-sensitive silver halide emulsion layer and silver halide-free layer being free from a dye bleach catalyst and processing the material in a processing bath containing a dye bleach catalyst, to give a colour image, the colour image being produced exclusively by image dyes present in the photographic material prior to exposure.

**14.** The colour images produced by a process according to claim **1**.

**4,391,885**

## METHOD OF MANUFACTURING FLUORESCENT SCREENS OF CATHODE RAY TUBES

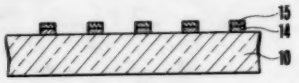
**Yoshifumi Tomita, and Hiromitsu Nakai, both of Mobara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 24, 1982, Ser. No. 361,269**

**Claims priority, application Japan, Mar. 27, 1981, 56-43919**

**Int. Cl.³ G03C *5/00***

**U.S. Cl. 430—28** **7 Claims**




**1.** A method of manufacturing a fluorescent screen of a cathode ray tube comprising the steps of:

forming a film of photosensitive sticky substance that exhibits stickiness when exposed to light on an inner surface of a face plate of said tube;

exposing said film to light to render portions thereof sticky;

applying a powdery substance onto said film to cause said powdery substance to adhere to said portions of the film rendered sticky;

removing excess powder to form a film pattern of said powdery substance;

causing the substance responsible for stickiness to ooze out onto said film pattern;

applying another powdery substance onto said film pattern; and

removing an excess of said another powdery substance, thus forming said fluorescent screen.

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**4,391,886**

## METHINE COLORANT MATERIALS AND THE USE THEREOF IN ELECTROPHORETIC MIGRATION IMAGING LAYERS AND PROCESSES

**Mark D. Frishberg, and James J. Krutak, Sr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

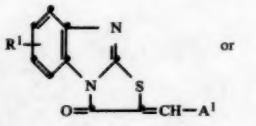
**Division of Ser. No. 161,705, Jun. 23, 1980, Pat. No. 4,304,908. This application Aug. 3, 1981, Ser. No. 289,574**

**Int. Cl.³ G03G *13/00, 5/06***

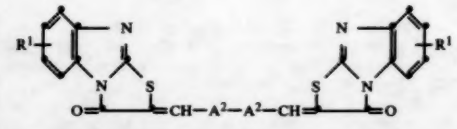
**U.S. Cl. 430—41** **19 Claims**

**1.** An electrophoretic migration imaging recording method comprising the steps of:

(a) providing an electrically photosensitive imaging layer comprising an electrically photosensitive particulate material having the following general structure:




or




wherein $R^1$ is hydrogen, lower alkyl, lower alkoxy, nitro, halogen, cyano, phenyl, lower alkylsulfonamido or lower alkoxycarbonyl and $A^1$ is a monovalent and $A^2$ is a divalent residue of an aniline, 1,2,3,4-tetrahydroquinoline, benzomorpholine or indoline compound attached to the =CH— group by an aromatic ring carbon atom in the position para to the aromatic amine nitrogen atom,

(b) applying an electrical field across said layer; and
(c) exposing said layer to an image pattern of electromagnetic radiation to which said electrically photosensitive material is photosensitive; and
(d) if necessary, at least partially liquifying said layer before, during or after exposure and application of the electric field to permit some migration of said electrically photosensitive material in said layer,
thereby forming a record of the image pattern of electromagnetic radiation in said layer.

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**4,391,887**

## PREPARATIONS OF MICRO-ORGANISMS

**Jörg Baumgarten; Werner Frommer; Delf Schmidt; Friedrich Schmidt, all of Wuppertal, Fed. Rep. of Germany, and Douglas M. Munnecke, Norman, Okla., assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Continuation of Ser. No. 945,287, Sep. 25, 1978, abandoned. This application Aug. 13, 1981, Ser. No. 292,362**

**Claims priority, application Fed. Rep. of Germany, Dec. 15, 1977, 2756032**

**Int. Cl.³ C12P *39/00*; C12N *1/36, 1/04, 1/20***

**U.S. Cl. 435—42** **13 Claims**

1. A process for the production of a storage-stable material capable of degrading a waste product comprising at least one of phosphate esters and acrylonitrile, comprising cultivating a mixed culture of microorganisms capable of growing on the waste product by feeding in the waste product at a progressively increasing concentration which does not kill the microorganisms due to by-product formation, terminating the cultivation when the waste product-splitting activity of the culture has leveled off, separating at least a portion of the now active mixed culture and repeating the cultivation at least once to produce a stabilized active mixed culture, treating the stabilized active mixed culture chemically, and then drying to obtain a storage-stable active mixed culture.

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**4,391,888**

## MULTILAYERED ORGANIC PHOTOCONDUCTIVE ELEMENT AND PROCESS USING POLYCARBONATE BARRIER LAYER AND CHARGE GENERATING LAYER

**Mike S. H. Chang, Danbury, and Michael F. Berman, Bridgeport, both of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.**

**Filed Dec. 16, 1981, Ser. No. 331,401**

**Int. Cl.³ G03G *5/06***

**U.S. Cl. 430—57** **15 Claims**

1. An organic photoconductive element which is extremely sensitive to exposure to light rays in the near-infrared region of the spectrum, said element comprising an electroconductive plastic film support; a first layer on said support comprising at least one polycarbonate resin having a weight average molecular weight ranging from about 25,000 to about 45,000, said first layer capable of functioning in a dual capacity as a barrier layer to prevent substantially any leakage of charge from the surface of said photoconductor and as a bonding layer; a charge generating layer comprising a dispersion coated layer formed of at least one diane blue dye containing from about 2 to about 75 percent by weight of at least one squarylium dye based upon the total weight of the charge generating layer; and a charge transport layer comprising a conventional organic chemical capable of transporting electrical charges generated by said charge generating layer in areas of said element exposed to said light rays.

9. A method for forming an electrophotographic image comprising:
(a) electrostatically charging in the dark the surface of an organic photoconductive element which is extremely sensitive to exposure to light rays in the near-infrared region of the spectrum, said element comprising an electroconductive plastic film support; a first layer on said support comprising at least one polycarbonate resin having a weight average molecular weight ranging from about 25,000 to about 45,000; said first layer capable of functioning in a dual capacity as a barrier layer to prevent substantially any leakage of charge from the surface of said photoconductor and as a bonding layer; a charge generating layer comprising a dispersion coated layer formed of at least one diane blue dye containing from about 2 to about 75 percent by weight of at least one squarylium dye based upon the total weight of the charge generating layer, and a charge transport layer comprising a conventional organic chemical capable of transporting electrical charges generated by said charge generating layer in areas of said exposed to said light rays;
(b) exposing the photoconductive element to actinic radiation; and
(c) discharging said surface of the photoconductive element in an image-wise fashion corresponding to the pattern of actinic radiation to produce a latent electrostatic image thereon.

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**4,391,889**

## ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER WITH BENZIMIDAZOLE RING CONTAINING HYDRAZONES

**Minoru Mabuchi, Tokyo; Kiyoshi Sakai, Mitaka; Shozo Ishikawa, Sayama; Yuji Egashira, Hino, and Makoto Kitahara, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

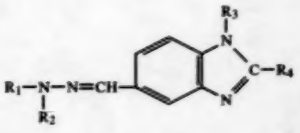
**Filed Nov. 23, 1981, Ser. No. 323,880**

**Claims priority, application Japan, Dec. 13, 1980, 55-175250**

**Int. Cl.³ G03G *5/04***

**U.S. Cl. 430—59** **17 Claims**

1. An electrophotographic photosensitive member which comprises an electrically conductive layer and a layer containing at least one member of the hydrazone compounds of the formula:



where $R_1$, $R_2$ and $R_3$ are selected from the group consisting of substituted or unsubstituted alkyl, substituted or unsubstituted aralkyl, and substituted or unsubstituted aryl, and $R_1$ and $R_2$ can not be simultaneously alkyl; and $R_4$ is substituted or unsubstituted aryl and a binder.

2. An electrophotographic photosensitive member according to claim 1 in which there are a layer containing the hydrazone compound and a charge generation layer.

3. An electrophotographic photosensitive member according to claim 2 in which the layer containing the hydrazone compound is a charge transport layer capable of transporting holes formed in the charge generation layer.

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**4,391,890**

## DEVELOPER COMPOSITIONS CONTAINING ALKYL PYRIDINIUM TOLUENE SULFONATES

**Chin H. Lu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Dec. 3, 1981, Ser. No. 327,294**

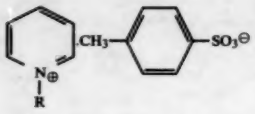
**The portion of the term of this patent subsequent to Nov. 3, 1998, has been disclaimed.**

**Int. Cl.³ G03G *9/10***

**U.S. Cl. 430—110** **20 Claims**

1. An electrostatic developer composition comprised of toner particles and carrier particles, the toner particles being comprised of resin particles, pigment particles, and from about 0.1 to about 10 percent based on the weight of the toner parti-

cles of an alkyl pyridinium toluene sulfonate charge enhancing additive of the formula:



wherein R is an alkyl radical containing from about 12 carbon atoms to about 25 carbon atoms.

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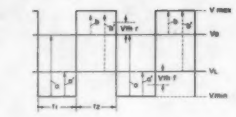
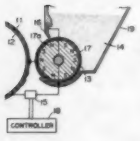
**4,391,891**

## DEVELOPING METHOD USING (ALTERNATING ELECTRIC FIELD AND) A DEVELOPER OF THE FIELD-DEPENDENT TYPE AND AN APPARATUS THEREFOR

**Yasuyuki Tamura, Kawasaki; Junichiro Kanbe, Tokyo; Shunji Nakamura, Kawasaki; Tsutomu Toyono, and Tohru Takahashi, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 124,911, Feb. 26, 1980, abandoned. This application May 20, 1982, Ser. No. 380,391**
**Claims priority, application Japan, Mar. 5, 1979, 54-25322**
**Int. Cl.³ G03G *13/09***
**U.S. Cl. 430—120** **8 Claims**





1. A developing method for developing the latent image on a latent image bearing member, comprising:

forming a layer of one-component developer on a developer supporting member, wherein said layer has a thickness which is less than a clearance, at a developing station, between the image bearing member and the supporting member, and wherein said developer is selected as having a volume resistivity which varies with variations in an electric field to which it is subjected;

conveying said layer of one-component developer to the developing station;

applying an alternating electric field between said developer layer supporting member and said latent image bearing member at the developing station, whereby said alternating electric field causes transition of said developer from said developer supporting member to both the image and non-image areas of said latent image bearing member and back transition of said developer from said latent image bearing member to said supporting member; and

reducing the intensity of said alternating electric field to thereby cause said back transition at least in the non-image areas and leave a developed image on said latent image bearing member.

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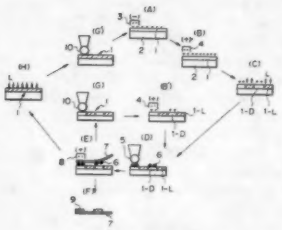
**4,391,892**

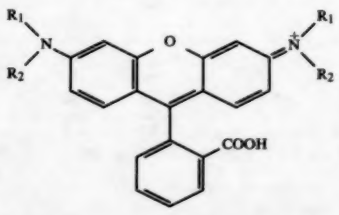
## MULTIPLE COPY ELECTROPHOTOGRAPHIC PROCESS USING DYE SENSITIZED ZnO

**Yasushi Kamezaki, Sakai; Eiichi Inoue, Tokyo; Hitoshi Nishihama, Hirakata; Akira Fushida, Suita, and Joji Matsumoto, Neyagawa, all of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan**

**Continuation-in-part of Ser. No. 174,503, Aug. 1, 1980, abandoned. This application Nov. 13, 1981, Ser. No. 321,102**
**Claims priority, application Japan, Aug. 3, 1979, 54-98686**
**Int. Cl.³ G03G *13/22, 13/02***
**U.S. Cl. 430—126** **13 Claims**



1. in an electrostatic photographic process comprising subjecting an electrostatic photographic photosensitive plate to the combination of negative charging, positive charging and imagewise exposure to form an electrostatic latent image of a positive polarity, said electrostatic photographic photosensitive plate having such charging characteristics that (a) a photosensitive layer can be positively charged by sequential negative corona charging and positive corona charging and (b) positive charging is rendered substantially impossible by irradiation with light, and then subjecting the so treated photosensitive plate to positive charging a predetermined number of times, whereby an electrostatic latent image is formed the predetermined number of times by imagewise exposure conducted once, an improvement wherein said electrostatic photographic photosensitive plate comprises an electrically conductive substrate having a surface with a work function smaller than the work function of ZnO and being selected from the group consisting of aluminum, zinc, cadmium, lead, indium and tin and a photoconductive zinc oxide-resin binder dispersion photosensitive layer comprising a dispersion of photoconductive zinc oxide having a particle size not larger than 0.53 μm and a BET specific surface area of at least 4.6 $m^2/g$ and a resin binder having a volume resistivity of at least $10^{14}$ Ω-cm, in which the resin binder/zinc oxide mixing weight ratio is larger than 1/10 and smaller than 5/10, said photoconductive layer further comprising a triphenylmethane basic dyestuff represented by the following formula:



wherein $R_1$ represents a lower alkyl group and $R_2$ represents a hydrogen atom or a lower alkyl group, in an amount of about 2 to about 3 mg per 10 g of zinc oxide and a silicone oil in an amount of about 0.02 to about 0.04 mg per 10 g of zinc oxide, and said photosensitive plate has a memory resistance (R), defined by the following formula, of at least 90%:

$$R = \frac{EL}{ED} \times 100$$

wherein ED stands for the saturation charge voltage (V) of the photosensitive layer observed when the photosensitive layer is stored in the dark for 3 hours and is then subjected to corona discharge at a voltage of −6 KV and EL stands for the saturation charge voltage (V) of the photosensitive layer observed when the photosensitive layer is irradiated with light in a light quantity of $3 \times 10^5$ lux.sec, stored in the dark for 1 minute and then subjected to corona discharge under the same conditions as described above.

6. An electrostatic photographic process according to claim 1, wherein the photosensitive layer is subjected to alternating current corona discharge or direct current negative corona discharge to uniformly charge the photosensitive layer negatively, the so charged photosensitive layer is subjected to direct current positive corona discharge to uniformly charge the photosensitive layer positively, and the so positively charged photosensitive material is subjected to imagewise exposure to form an electrostatic latent image in which the non-exposed area is positively charged and the exposed area is not substantially charged.

7. An electrostatic photographic reproduction process in which an electrostatic latent image formed according to the electrostatic photographic process set forth in claim 6 is developed with a toner having an electric resistance of at least $10^{13}$ Ω-cm and the toner image formed on the photosensitive layer is transferred onto a transfer sheet and is then fixed.

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## 4,391,893
## MAGNETIC DEVELOPERS AND PROCESS FOR THEIR PREPARATION

**Dieter Hendriks, Geneva, Switzerland, assignor to Sublistatic Holding, S.A., Glaris, Switzerland**

**Continuation of Ser. No. 948,288, Oct. 2, 1978, abandoned, which is a continuation of Ser. No. 737,371, Nov. 1, 1976, abandoned. This application Oct. 30, 1980, Ser. No. 202,100**

**Claims priority, application Switzerland, Nov. 6, 1975, 14347/75; Jan. 30, 1976, 1200/76**

**Int. Cl.³ G03G *9/10***

**U.S. Cl. 430—137** **5 Claims**

1. Process for the preparation of a developer in the form of virtually spherical particles, wherein a dispersion in water containing (A) 3-hydroxyquinophthalone or (B) an anthraquinone dyestuff which contains at least (1) two amino substituents different from one another or (2) one amino and one hydroxy substituent and which passes into the vapor state at between 150° and 220° C. under atmospheric conditions, of magnetic particles and of a coating material consisting of an aqueous dispersion of a thermoplastic resin or of a mixture of a thermoplastic resin with a wax or a plasticiser, is sprayed in the form of fine droplets and then dried in an appropriate stream of air in a spray dryer apparatus.

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## 4,391,894
## COLORED PHOTOSENSITIVE COMPOSITION

**Ken-ichi Shimazu, Pleasantville, and Albert Deutsch, Scarsdale, both of N.Y., assignors to Polychrome Corporation, Yonkers, N.Y.**

**Continuation of Ser. No. 919,098, Jun. 20, 1978, abandoned, which is a continuation-in-part of Ser. No. 521,433, Nov. 6, 1974, abandoned. This application Aug. 28, 1981, Ser. No. 298,054**

**Int. Cl.³ G03C *1/60, 11/18*; G03F *1/00*; G03C *1/71***

**U.S. Cl. 430—154** **9 Claims**

1. A method of providing a substantially uniform colored photosensitive composition useful in the reprographic art, which comprises:

a. Reacting a water soluble basic dye with a water soluble organic acid or the ammonium or alkali metal salt thereof, in an aqueous medium to precipitate a dye substance which is substantially insoluble in water, substantially soluble in organic solvents and substantially non-reactive with diazo photosensitizers;

b. Separating said precipitated dye substance from its aqueous environment; and

c. Substantially uniformally dissolving said separated dye substance and a diazo photosensitive composition useful in the reprographic arts in a suitable organic solvent composition said diazo photosensitive composition being a reaction product of a paradiazo diphenylamine-paraformaldehyde condensate with a coupling agent selected from the group consisting of naphthol sulfonic acids and salts thereof, sulfoanthranilic acid, N-lower alkyl-5- sulfoanthranilic acids, sodium 2,2'-dihydroxy-4,4'-dimethoxy-5-sulfobenzophenone, and 2-hydroxy-4-methoxy-benzophenone-5-sulfonic acid and a trihydrate thereof; and

d. Removing said solvent composition.

9. An article useful in the reprographic arts which comprises a sheet substrate having uniformly applied on at least one surface thereof the colored photosensitive compositions produced by the method of claim 1.

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## 4,391,895
## DIFFUSION CONTROL LAYERS FOR DIFFUSION TRANSFER PHOTOGRAPHIC FILM

**William C. Schwarzel, Billerica, and Lloyd D. Taylor, Lexington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.**

**Filed Jan. 2, 1981, Ser. No. 222,031**

**Int. Cl.³ G03C *1/76, 1/40, 1/48, 5/54***

**U.S. Cl. 430—215** **31 Claims**

1. A diffusion transfer photographic film unit comprising:

a photosensitive element including at least one photosensitized silver halide emulsion layer having an image-dye forming material associated therewith;

an image-receiving layer;

a means for introducing an alkaline processing composition within said film unit;

a neutralizing layer; and,

at least one diffusion control layer positioned between interacting components of said film unit;

said diffusion control layer comprising a urethane polymer containing a recurrent backbone unit capable of undergoing $\beta$-elimination depolymerization in an alkaline environment.

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## 4,391,896
## MIXTURE OF NONDIFFUSIBLE REDOX DYE-RELEASERS FOR CURVE SHAPE CONTROL

**Thomas O. Maier, and Jack L. Richards, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 20, 1978, Ser. No. 944,113**

**Int. Cl.³ G03C *1/40, 1/10, 5/54***

**U.S. Cl. 430—223** **39 Claims**

14. In a photographic assemblage comprising:

(a) a support having thereon at least one photosensitive silver halide emulsion layer having associated therewith a first ballasted, nondiffusible, redox, dye-releasing or dye precursor-releasing compound capable of releasing a diffusible dye or dye precursor;

(b) a dye image-receiving layer; and

(c) an alkaline processing composition and means for discharging same within said assemblage;

said assemblage containing a silver halide developing agent; the improvement wherein said silver halide emulsion layer has associated therewith a second ballasted, nondiffusible, redox, dye-releasing or dye precursor-releasing compound capable of releasing a diffusible dye or dye precursor, said second compound having a different relative reactivity than said first compound, the reactivity of the compound which is more-reactive being at least 1.5 times the reactivity of the compound which is less-reactive.

15. The photographic assemblage of claim 14 wherein each

said ballasted compound has said dye or dye precursor moiety attached thereto through a sulfonamido group which is alkali-cleavable upon oxidation.

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4,391,897

## DIAZO LITHOGRAPHIC PRINTING PLATE DEVELOPING PROCESS

Robert F. Gracia, Scituate, Mass., and Howard A. Fromson, 15 Rognes Ridge Rd., Weston, Conn. 06880, assignors to Howard A. Fromson, Weston, Conn.

Continuation-in-part of Ser. No. 85,146, Oct. 12, 1979, abandoned. This application Jun. 17, 1981, Ser. No. 274,341

Int. Cl.³ G03F 7/08

U.S. Cl. 430—302 6 Claims

1. Process for removing unexposed diazo from a lithographic printing plate comprising a silicated aluminum substrate having a hydrophilic, anionic, negatively charged surface and on and bonded to the substrate, a light sensitive, cationic, positively charged, water-soluble diazo material which has been selectively exposed to actinic light in an image area which comprises contacting the plate after exposure with a solution consisting essentially of an anionic material in water in a quantity and for a time sufficient to couple the diazo with the anionic material and dissolve the coupled product from the non-image area thereby overcoming the bond between the diazo and the substrate leaving a clean, hydrophilic non-image area.

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4,391,898

## METHOD OF MAKING A SLEEVE FOR A PRINTING CYLINDER

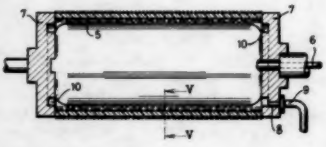
Hendricus J. van der Velden, RN Cuyck, Netherlands, assignor to Stork Screens, B.V., Boxmeer, Netherlands

Filed Jun. 26, 1981, Ser. No. 277,866

Claims priority, application Netherlands, Jul. 4, 1980, 8003895

Int. Cl.³ G03F 7/02

U.S. Cl. 430—306 8 Claims




7. A method of forming a cylindrical sleeve for a printing cylinder, comprising the steps of disposing a thin-walled cylindrical screen about the outer suface of a temporary, rigid, cylindrical support, said screen defining a pattern of interconnected channels extending to the lateral edges of said surface, applying a sheet of elastomeric composition which is hardenable under the influence of radiation about said screen, said sheet comprising a photopolymer, applying a vacuum to said channels for removing any accumulated gases between the outer surface of said support and said sheet, and subjecting said sheet to a heat treatment for securing said screen and sheet together by curing, the heat treatment being carried out after removing said screen and said sheet from said support, and thereafter closely fitting said secured together screen and sheet after the heat treatment about a cylindrical core member, and providing a pattern on the outer surface of said sheet using a radiation process.

4,391,899

## METHOD OF MAKING A HALF-TONE GRAVURE PRINTING PLATE

Teruo Suzuki, Ageo, Japan, assignor to Toppan Printing Co., Ltd., Japan

Filed Aug. 25, 1981, Ser. No. 296,197

Claims priority, application Japan, Aug. 28, 1980, 55-118712

Int. Cl.³ G03C 5/00

U.S. Cl. 430—307 2 Claims

1. A method of making a gravure printing plate by using a planographic or relief half-tone positive comprising the steps of:

contacting said half-tone positive on a photosensitive film of low contrast, projecting light on said photosensitive film and thereafter effecting development thereof to thereby make a half-tone negative which is inverted relative to said half-tone positive;

contacting a contact screen on a lith-type photosensitive film with said negative being used as an original;

forming an image of said half-tone negative on said lith-type photosensitive film with a camera, the F number of the diaphragm of the lens of said camera being selected to make it impossible to resolve the dots of said half-tone negative at a resolving power ($R_L$) represented by

$$R_L = \frac{1}{1.22\,\lambda F(1+m)}$$

(where $R_L$ is the resolving power of the lens, $\lambda$ is the wavelength of photographing light, F is the F number of the diaphragm of the lens of said camera, and m is the photographing magnification) thereby producing an image formed on said lith-type photosensitive film which is different in at least one respect as to the shape of at least one dot, the number of screen lines of said contact screen or a screen angle in comparison with that of said original half-tone positive;

developing said lith-type photosensitive film to make a new planographic or relief half-tone positive which is different in at least one respect as to the number of screen lines, the screen angle, the magnification and the shape of at least one dot in comparison with said original half-tone positive;

effecting the following steps:

exposing said half-tone positive from said lith-type photosensitive film to light in contact with a photosensitive resist forming material,

correcting an error in gradation of a middle tone portion between said new half-tone positive and said original half-tone positive by means of exposing said photosensitive resist forming material to the light so that the dots of said half-tone positive may be blurred by forming a spacing between said new half-tone positive and said photosensitive resist forming material, and

exposing a gravure screen to light in contact with said photosensitive resist forming material; and

etching a gravure cylinder through said resist on said cylinder.

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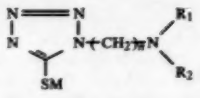
**4,391,900**

## PROCESS FOR DEVELOPMENT-PROCESSING SILVER HALIDE LIGHT-SENSITIVE MATERIAL

**Takashi Toyoda; Tadao Shishido, both of Minami-ashigara, and Teruaki Tsujikawa, Otsu, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jan. 13, 1982, Ser. No. 339,243**
**Claims priority, application Japan, Jan. 13, 1981, 56-3487**
**Int. Cl.³ G03C 5/30**
**U.S. Cl. 430—355** **19 Claims**

1. A process for development-processing an imagewise exposed silver halide photographic light-sensitive material comprising processing the material with a developing solution containing 0.1 mol/liter or more of sulfite ion and at least one compound represented by formula (I)



(I)

wherein n represents an integer of from 2 to 6; each of $R_1$ and $R_2$ represents an alkyl group having from 1 to 6 carbon atoms; and M represents hydrogen or an alkali metal atom.

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**4,391,901**

## PHOTOSENSITIVITY ENHANCEMENT OF PLZT CERAMICS BY POSITIVE ION IMPLANTATION

**Cecil E. Land, and Paul S. Peercy, both of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Continuation-in-part of Ser. No. 159,318, Jun. 13, 1980, abandoned. This application Jan. 28, 1982, Ser. No. 343,612**
**Int. Cl.³ G03C 1/00**
**U.S. Cl. 430—495** **11 Claims**

1. In a lead lanthanum zirconate titanate (PLZT) ceramic plate used for a photoferroelectric image storage and display device, the improvement comprising: the PLZT ceramic having a near surface region implanted with positive ions to provide enhanced photosensitivity of the plate in the near-UV spectrum, wherein said ions are selected from the group consisting of helium ions, hydrogen ions, argon ions, neon ions, aluminum ions, chromium ions, and iron ions, and are implanted below the surface of said PLZT plate at a depth of from 0.1 to 2 microns.

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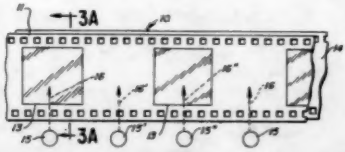
**4,391,902**

## PHOTOGRAPHIC FILM WITH VARIABLE WINDOWS

**Robert F. Wilde, 2023 Sheffield, Chicago, Ill. 60614**

**Filed Oct. 13, 1981, Ser. No. 310,882**
**Int. Cl.³ G03C 3/02**
**U.S. Cl. 430—501** **6 Claims**




1. A film product comprising at least two elongated film strips of photosensitive material each divided into a sequence of longitudinally spaced frames and arranged in face-to-face, superposed relation with the frames of the strips being longitudinally aligned, one of said film strips having certain of the frames thereof free of said photosensitive material whereby light from an image to be photographed is adapted to pass therethrough for registry on the next adjacent superposed strip, said strips being wound on a single spool.

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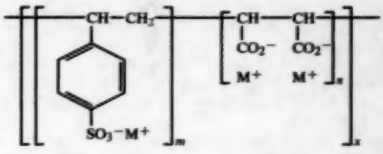
**4,391,903**

## IONIC COPOLYMERS IN PHOTOGRAPHIC LIGHT-SENSITIVE SILVER HALIDE FILMS

**Peter K. Sysak, Wilmington, Del., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.**

**Filed Feb. 8, 1982, Ser. No. 346,738**
**Int. Cl.³ G03C 1/72**
**U.S. Cl. 430—629** **5 Claims**

1. A photographic film comprising a silver halide emulsion layer superimposed on a support, characterized in that the binder component of the silver halide emulsion layer consists essentially of a major amount in parts by weight of gelatin and a minor amount in parts by weight of a poly(styrene sulfonic acid-co-maleic acid) salt of the formula:



wherein M is an alkali metal, m=1–3, n=1, and x=5–50.

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**4,391,904**

## TEST STRIP KITS IN IMMUNOASSAYS AND COMPOSITIONS THEREIN

**David J. Litman, Cupertino, and Edwin F. Ullman, Atherton, both of Calif., assignors to Syva Company, Palo Alto, Calif.**

**Continuation-in-part of Ser. No. 106,620, Dec. 26, 1979, Pat. No. 4,299,916. This application Apr. 17, 1981, Ser. No. 255,022**
**The portion of the term of this patent subsequent to Nov. 10, 1998, has been disclaimed.**
**Int. Cl.³ G01N 33/54, 21/00, 1/48, 21/06**
**U.S. Cl. 435—7** **9 Claims**

1. A kit for use in an immunoassay comprising in combination:

(a) an insoluble porous surface to which is bound (1) a member of an immunological pair consisting of ligand and immunoglobulin antiligand and (2) an enzyme;

(b) an enzyme bound to a member of an immunological pair consisting of ligand and an immunoglobulin antiligand; and

(c) a leuco dye which undergoes an enzymatically catalyzed reaction to produce an insoluble dye,

wherein the amount of enzyme bound to said member of an immunological pair is related to the amount of said member of an immunological pair bound to an insoluble surface in a ratio to substantially optimize the sensitivity of said immunoassay, wherein said enzyme bound to said porous surface and said enzyme bound to said member of an immunological pair are related by the product of one being the substrate of the other.

6. A method for detecting the presence of an antiligand analyte in a sample suspected of containing said analyte, wherein said antiligand analyte is a member of an immunological pair (mip) consisting of ligand and homologous antiligand; said method involving (1) the partitioning in relation to the amount of analyte in said sample of a first enzyme bound to a mip—enzyme-bound-mip—between a surface of a liquid phase, said surface being porous and permitting approach and binding of enzyme-bound-mip to mip bound

to said surface—mip-bound-surface—either directly or in combination with said ligand, where said partitioning is through the intermediacy of ligand-antiligand binding to a mip-bound-surface to which a second enzyme is bound, where said second enzyme is related to said first enzyme by the product of one being the substrate of the other and where said first and second enzymes are oxido reductases; and (2) the change in concentration of a signal generating compound associated with said surface, said change in concentration being in relation to the amount of reaction product produced by said enzyme bound to said surface; said method comprising:

(a) combining in an aqueous assay medium,

(1) said sample;

(2) mip-bound-surface, wherein substantially all of said surface and said mip-bound-surface is uniformly contacted with said sample;

(3) enzyme-bound-mip; and

(4) the remaining members of the signal producing system, which includes a solute system which is capable of undergoing a catalyzed reaction to produce a product which results in a change in amount of a signal generating compound associated with said surface and capable of producing a detectible signal;

(b) waiting a sufficient time for enzyme-bound-mip to diffuse to said surface and at least a portion of said enzyme-bound-mip to bind to said surface through the intermediacy of ligand-antiligand binding to result in a change in the amount of signal generating compound associated with said surface in relation to the amount of analyte in said sample; and

(c) determining the intensity of said detectible signal at said surface as a function of the amount of analyte in said sample.

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**4,391,905**

**SYSTEM FOR THE DETERMINATION OF GLUCOSE IN FLUIDS**

**Robert Bauer, Bristol, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.**

**Division of Ser. No. 233,928, Feb. 12, 1981, Pat. No. 4,340,669. This application Mar. 15, 1982, Ser. No. 358,266**

**Int. Cl.³ G01N *33/50*; C12Q *1/54***

**U.S. Cl. 435—14** **5 Claims**

1. A method for the semi-quantitative determination of glucose in urine which comprises contacting the urine with a test strip comprising a bibulous carrier matrix bearing the residue left by impregenating it with a liquid reagent solution comprised of a solvent, glucose oxidase, a peroxidatively active substance and m-anisidine with subsequent evaporation of the solvent to leave the dry reagent with the reagent components being present in the carrier matrix in amounts and proportions such that the carrier matrix is capable of differentiating between concentrations of 2,000 and 5,000 milligrams of glucose per deciliter, and determining the amount of glucose present from the color change in the reagent.

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**4,391,906**

**SYSTEM FOR THE DETERMINATION OF GLUCOSE IN FLUIDS**

**Robert Bauer, Bristol, Ind., assignor to Miles Laboratories, Inc., Elkhart, Ind.**

**Division of Ser. No. 233,928, Feb. 12, 1981, Pat. No. 4,340,669. This application Mar. 15, 1982, Ser. No. 358,267**

**Int. Cl.³ G01N *33/50*; C12Q *1/54***

**U.S. Cl. 435—14** **3 Claims**

1. A test capable of the determination of the presence of glucose in a liquid test sample which device comprises a carrier matrix which bears the residue left by impregnating it with a liquid reagent solution of solvent, glucose oxidase, a peroxidatively active substance and m-anisidine with subsequent evaporation of the solvent to leave the dry reagent composition wherein the reagent components are present in the carrier matrix in amounts and proportions such that the carrier matrix is capable of differentiating between concentrations of 2,000 and 5,000 milligrams of glucose per deciliter.

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**4,391,907**

**METHOD FOR PRODUCING L-VALINE BY FERMENTATION**

**Hiroshi Matsui; Takayasu Tsuchida, both of Kawasaki, and Shigeru Nakamori, Yokohama, all of Japan, assignors to Ajinomoto Company Incorporated, Tokyo, Japan**

**Filed Dec. 2, 1980, Ser. No. 212,123**

**Claims priority, application Japan, Dec. 13, 1979, 54-161974**

**Int. Cl.³ C12N *1/20, 15/00*; C12P *13/08*; C12R *1/185, 1/19***

**U.S. Cl. 435—115** **11 Claims**

1. A method of producing L-valine by fermentation which comprises culturing in a culture medium an L-valine-producing microorganism selected from the group consisting of *Escherichia coli* NRRL B-12287 and *Escherichia coli* NRRL B-12288 which is obtained by incorporation into a recipient strain of the genus Escherichia, of a hybrid plasmid having inserted therein a DNA fragment with genetic information related to L-valine production which fragment is derived from a donor strain of the genus Escherichia which is resistant to a valine analogue, and recovering the L-valine accumulated in the culture medium.

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**4,391,908**

**METHOD FOR PRODUCING CITRIC ACIDS**

**Takeshi Tabuchi, and Matazo Abe, both of Tokyo, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

**Continuation of Ser. No. 783,740, Dec. 13, 1968, abandoned, which is a continuation-in-part of Ser. No. 735,199, Jun. 7, 1968, abandoned. This application Jun. 16, 1978, Ser. No. 916,262**

**Claims priority, application Japan, Jun. 7, 1967, 52-36391; Dec. 13, 1967, 52-79802**

**Int. Cl.³ C12P *7/48*; C12N *1/28*; C12R *1/72, 1/73, 1/74***

**U.S. Cl. 435—144** **34 Claims**

1. A method for producing (+)-isocitric acid which comprises inoculating a (+)-isocitric acid-accumulating and hydrocarbon-assimilating strain of a yeast belonging to the genus Candida in an aqueous culture medium containing at least one normal paraffin containing 9 to 20 carbon atoms in the molecule as the main carbon source; incubating the culture at a pH of from about 4 to about 7.5 until (+)-isocitric acid is substantially accumulated in the culture broth; and separating the so-accumulated (+)-isocitric acid therefrom.

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**4,391,909**

**MICROCAPSULES CONTAINING VIABLE TISSUE CELLS**

**Franklin Lim, Richmond, Va., assignor to Damon Corporation, Needham Heights, Mass.**

**Continuation of Ser. No. 24,000, Mar. 28, 1979, Pat. No. 4,352,883, which is a continuation-in-part of Ser. No. 953,413, Oct. 23, 1978, abandoned. This application May 1, 1981, Ser. No. 259,595**

**The portion of the term of this patent subsequent to Oct. 5, 1999, has been disclaimed.**

**Int. Cl.³ C12N *11/10, 11/04, 5/00***

**U.S. Cl. 435—178** **12 Claims**

5. An artificial organ suitable for implantation in a mammalian body comprising a microcapsule comprising a polysaccharide having acidic groups thereof cross-linked with a polymer having a molecular weight greater than 3,000, said membrane being no greater than about 2.0 mm in diameter and containing one or more viable, healthy, physiologically active living tissue cells, said microcapsule being impermeable to immune system proteins but permeable to tissue nutrients and metabolic products produced by the tissue.

4,391,910

## PROCESSES FOR PRODUCING THERMOPHILIC ASPARTASE

Kazuo Kimura, Hofu; Kenichiro Takayama, Atsugi; Yutaka Ado, Machida; Tamotsu Kawamoto, Sagamihara, and Izumi Masunaga, Fuchu, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Nov. 24, 1980, Ser. No. 209,494

Claims priority, application Japan, Nov. 27, 1979, 54-152468

Int. Cl.[3] C12N *9/88;* C12P *13/20;* C12R *1/07*

U.S. Cl. 435—232 4 Claims

1. A process for producing thermophilic aspartase which comprises culturing a thermophilic aspartase producing *Bacillus aminogenes* having the identifying characterestics of NRRL B12061 or *Bacillus thermoaminophilus* having the identifying characteristics of NRRL B12060 in a nutrient medium until substantial enzymatic activity is detectable and thereafter isolating said thermophilic aspartase.

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4,391,911

## PREPARATION OF HERPES SIMPLEX ANTIGEN FOR THE DIAGNOSIS OF CARCINOMA

Giulio Tarro, Naples, Italy, assignor to Depa S.p.A., Italy

Filed Jan. 25, 1980, Ser. No. 115,375

Claims priority, application Italy, May 18, 1979, 49082 A/79

Int. Cl.[3] C12N *1/02, 7/02;* C12Q *1/00*

U.S. Cl. 435—239 13 Claims

1. A process for the industrial production of a non-virion antigen of the Herpes simplex virus for the diagnosis of the epithelial tissue tumors or carcinoma, in which the cells to be infected by the antigen are prepared starting from the guinea pig kidneys with the addition to said material of sterile trypsin and a culture medium consisting of lactoalbumin and calf serum, comprising the steps of:

(i) growing the cells with a dynamic system inside Spinner flasks provided with magnetic revolving stirrers rotating at speeds higher than about 50 r.p.m. and operating at a temperature of 37° C. and with successive additions of culture medium, inoculating the so obtained cells with Herpes simplex virus to with added culture medium, said infection phase being performed according to a volume ratio of the virus to the cells equal or higher than 1, but not higher than 100, the contact between the cells and the virus being maintained for about 3 hours; and collecting the antigen which is formed therein;

(ii) purifying the collected antigen, by removing therefrom all the proteins and impurities which can negatively affect the tests for the diagnosis; comprising, a first centrifugation with recovery of the liquid phase from the first centrifugation step; precipitating the antigen protein and other proteins, a second centrifugation; diluting the residual solids from the second contrifugation using a buffer; purifying said diluted solids by molecular separation using organic gellified copolymers extraction column, collecting the proteins from the antigen purification on a column wherein the proteins are separated on the basis of their different electric charges; eluting said collected proteins and removing the non-glycosilated proteins by affinity chromatography on a column; and recovering purified antigens.

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4,391,912

## CELL CULTIVATION METHOD AND FLOATING ANIMAL CELL CULTURE UNIT FOR THE SAME

Koichi Yoshida, Fuji, and Fusakazu Hayano, Chigasaki, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

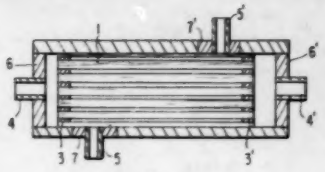
Filed Sep. 18, 1980, Ser. No. 188,416

Claims priority, application Japan, Sep. 18, 1979, 54/118833

Int. Cl.[3] C12N *5/02;* C12M *3/00*

U.S. Cl. 435—241 10 Claims

1. A method for cultivating floating animal cells comprising introducing a culture medium into a cell culture unit comprising a shell and a plurality of hollow fibers enclosed in the shell, said hollow fibers being open at either end outside of the shell and having a pore diameter of from about 20 A to $10^5$ A,




wherein the culture medium passes through the interior of the hollow fibers and floating animal cells are introduced and are cultivated in the space between the shell and the hollow fibers.

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4,391,913

## TEMPERATURE REGULATING SYSTEM FOR THE CONTROL OF TEMPERATURE IN A ROOM

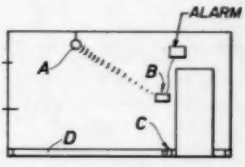
Erik C. V. Keldmann, Bellinge, Denmark, assignor to Elpan ApS, Odense, Denmark

Continuation-in-part of Ser. No. 48,638, Jun. 14, 1979, abandoned. This application Jun. 14, 1982, Ser. No. 388,214

Claims priority, application Denmark, May 21, 1979, 2074/79

Int. Cl.[3] F28F *27/00;* G01K *7/00*

U.S. Cl. 236—36 4 Claims



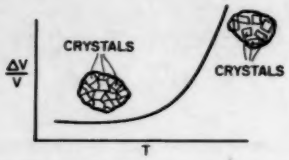

1. A temperature regulating system for controlling the temperature in a room comprising a feeler gauge adapted to control the supply of energy to a radiator system in the room, said gauge being adapted to be suspended in a room and comprising a radiation sensor and a convection sensor for sensing the radiation and air temperature respectively, and a wireless transmitter means, said convection sensor being operatively connected to said transmitter means to control the transmitter means to emit signals depending on the radiation and air temperature sensed at regular intervals, and a receiver controlling means for receiving said signals and regulating the supply of energy to the radiator system, said convection sensor comprising a thermal sensitive member for sensing air temperature and having properties which change in response to temperature changes, said radiation sensor comprising a thin-walled hemisphere of good heat-conducting material having a black mat radiation absorbing surface connected in heat-conducting relationship with said convection sensor, said transmitter means comprising a printed circuit including said convection sensor therein so that signals representing said changed properties are transmitted by said transmitter means to said receiver, programming means in said receiver whereby the desired temperature can be programmed in the receiver, and means to compare said signals with said desired temperature.

4,391,914

## STRENGTHENED GLASS-CERAMIC ARTICLE AND METHOD

George H. Beall, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Jun. 14, 1982, Ser. No. 387,790
Int. Cl.³ C03C 3/22, 3/04
U.S. Cl. 501—4 3 Claims




1. A glass-ceramic body composed essentially of two phases, a crystal phase and a residual glass matrix, the crystal phase being a lithium aluminosilicate selected from the group of beta-spodumene solid solution and a stuffed beta-quartz solid solution having a very low coefficient of thermal expansion, the residual glass matrix being a borosilicate or a boroaluminosilicate constituting about 15–30 percent by volume of the body but being geometrically isolated in some areas of said body, thereby setting up point compressive stresses in the crystalline network to develop a transgranular fracture pattern in said body, and having a coefficient of thermal expansion substantially higher than that of the crystal phase, the two phases forming a dilatant system wherein the thermal expansion curve of the system has two distinct sections diverging from a transition temperature in the range of 500°–750° C., the upper section of the curve being steep and being controlled by the residual glass phase, and the lower section being essentially flat and corresponding to the curve of the crystal phase, the body being chemically composed essentially of, in percent by weight as calculated on an oxide basis, 60–80% $SiO_2$, 14–25% $Al_2O_3$, 2.5–7% $Li_2O$, 2–5%, $B_2O_3$, 0–2% MgO and/or ZnO, 3–6% $TiO_2$ and/or $ZrO_2$ and 0.5–5 mole percent of glass-modifying oxides selected from $Na_2O$, $K_2O$ and the divalent oxides CaO, BaO, SnO and PbO, the molar ratio of $Al_2O_3$:$Li_2O$ being greater than unity.

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4,391,915

## PRECISION PRESSED OPTICAL COMPONENTS MADE OF GLASS AND GLASS SUITABLE THEREFOR

Gertraud A. A. Meden-Piesslinger, and Johannes H. P. Van de Heuvel, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 7, 1981, Ser. No. 328,344
Claims priority, application Netherlands, Oct. 22, 1981, 8104778
Int. Cl.³ C03C 3/16
U.S. Cl. 501—48 4 Claims

1. Precision pressed optical components made of glass, which components are pressed from a glass containing phosphorus pentoxide ($P_2O_5$), one or more alkali metal oxides and one or more alkaline earth oxides, characterized in that the glass consists of in a percentage by weight:

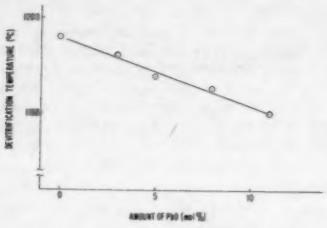
$P_2O_5$: 45–55
$Al_2O_3$: 3.5–9
$K_2O$: 5–20
$Li_2O$: 0–3
BaO: 8–15
ZnO: 4.5–9
MgO: 0–6
PbO: 0–18
$SiO_2$: 0–1
$B_2O_3$: 0–3
$TiO_2$: 0–2.

4,391,916

## ALKALI-FREE GLASS FOR PHOTOETCHING MASK

Kenji Nakagawa, Tokorozawa, and Isao Masuda, Tokyo, both of Japan, assignors to Hoya Corporation, Tokyo, Japan

Filed Feb. 24, 1982, Ser. No. 351,688
Claims priority, application Japan, Aug. 14, 1981, 56-126805
Int. Cl.³ C03C 3/10
U.S. Cl. 501—62 2 Claims




1. An alkali-free glass for a photoetching mask, consisting essentially of, 55 to 65% $SiO_2$, 7 to 11% $Al_2O_3$, 1 to 11% PbO, 7 to 20% CaO, 3 to 13% MgO, 3 to 13% ZnO, 0 to 3% $ZrO_2$, 0 to 3% $F_2$, 0 to 5% $As_2O_3$ and 0 to 5% $Sb_2O_3$, wherein all percents are molar.

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4,391,917

## ALUMINO-SILICATE REFRACTORY BRICK

David J. Michael, White Oak, and Berhl E. Wishon, Bethel Park, both of Pa., assignors to Dresser Industries, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 200,809, Oct. 27, 1980, abandoned. This application Jul. 26, 1982, Ser. No. 402,008
Int. Cl.³ C04B 35/18, 35/52
U.S. Cl. 501—100 7 Claims

1. Carbonaceous bonded refractory shapes comprising from about 1 to 35%, by weight, carbon and the balance a non-basic refractory aggregate, said refractory aggregate comprising at least about 75%, by weight, andalusite, said refractory shapes being characterized by the absence of substantial shrinkage after coking at 2000° F., and the absence of mullite.

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4,391,918

## CERAMIC FOAM FILTER AND AQUEOUS SLURRY FOR MAKING SAME

Jerry W. Brockmeyer, Hendersonville, N.C., assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Division of Ser. No. 227,134, Jan. 22, 1981, Pat. No. 4,343,704. This application Feb. 19, 1982, Ser. No. 350,400
Int. Cl.³ C04B 35/02
U.S. Cl. 501—127 8 Claims

1. An aqueous slurry for use in preparing a ceramic foam having the following composition: 55 to 70% $Al_2O_3$, 2 to 10% micron-sized reactive alumina, 1 to 5% montmorillonite and 1 to 10% ceramic fibers.

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4,391,919

## ALCOHOL SEPARATION PROCESS

Ian D. Burdett, Charleston, W. Va., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Jun. 30, 1981, Ser. No. 279,098
Int. Cl.³ C07C 27/06, 27/34
U.S. Cl. 518—725 13 Claims

1. A process for separating alkane polyol from a liquid phase homogeneous mixture obtained from a homogeneous liquid phase reaction of oxides of carbon and hydrogen to produce alkane polyol, said liquid phase homogeneous mixture comprising alkane polyol, production solvent and catalyst compris-

ing rhodium, ruthenium or cobalt as the carbonyl complex, wherein said production solvent is a solvent for rhodium, ruthenium or cobalt of the catalyst, said process comprising:

(a) extracting at a temperature of at least about 50° C., alkane polyol from said liquid phase homogeneous mixture by contact with an extraction solvent of polyhydric alcohol having at least four carbon atoms and at least four hydroxyl groups, such that two liquid phases are formed, one phase containing the greater concentration of alkane polyol and extraction solvent and the other phase containing the greater concentration of production solvent and the greater portion of rhodium, ruthenium or cobalt of the catalyst,

(b) separating phases, and

(c) recovering alkane polyol from the extraction solvent-containing phase.

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**4,391,920**

**POROSE, PULVERFORMIGE POLYMERTEILCHEN**

**Wolfgang Lange, Obernburg, Fed. Rep. of Germany, assignor to Akzo NV, Arnhem, Netherlands**

**Filed Jul. 15, 1981, Ser. No. 283,675**

**Claims priority, application Fed. Rep. of Germany, Jul. 15, 1980, 3026688**

**Int. Cl.³ C08J 9/26**

**U.S. Cl. 521—61** **14 Claims**

1. Process for the production of powdery, porous polymer particles, characterized by the introduction into a bed of solid-substance particles at a temperature above the segregating temperature, of a homogenous mixture having a minimum of two components, one component therein being a meltable polymer and the other component a fluid inert to the polymer, both components forming a binary system which has in its liquid phase a range of complete miscibility and also a range with a miscibility gap, by subsequent cooling said mixture to a temperature below the solidification temperature of the polymer in the mixture, by comminution of the cake-like mass as obtained and by separation of the polymer substance from the inert fluid and solid-substance particles.

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**4,391,921**

**ELASTOMERIC SILICONE SPONGE**

**Robert D. Johnson, Charlotte, N.C., assignor to Dow Corning Corporation, Midland, Mich.**

**Filed Jun. 25, 1982, Ser. No. 391,898**

**Int. Cl.³ C08J 9/28, 9/30**

**U.S. Cl. 521—66** **13 Claims**

1. A method comprising

(a) freezing a silicone emulsion which provides an elastomeric product upon removal of the water, having a pH in the range of 9 to 11.5 inclusive, comprising water, 100 parts by weight of an anionically stabilized hydroxyl endblocked polydiorganosiloxane having an average molecular weight of greater than 10,000, an organic tin compound, and at least one part by weight colloidal silica, long enough to freeze the water and produce a solid frozen article,

(b) thawing the solid frozen article yielding a wet elastomeric sponge-like article, and

(c) drying the wet elastomeric sponge-like article until the water is removed and an elastomeric sponge is obtained.

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**4,391,922**

**BLOWING AGENTS AS CURATIVES FOR ETHYLENE/CARBON MONOXIDE COPOLYMERS**

**Jerald R. Harrell, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed May 6, 1982, Ser. No. 375,467**

**Int. Cl.³ C08J 9/10**

**U.S. Cl. 521—88** **10 Claims**

1. A foamable composition comprising

(a) a copolymer having a melt index of 0.1 to 500 of (i) ethylene (ii) about 1 to 25 weight percent carbon monoxide based on the copolymer (iii) 1 to 75 weight percent based on the copolymer, of a softening monomer selected from the group consisting of alkyl acrylates and methacrylates having linear or branched alkyl groups of 1 to 18 carbon atoms, vinyl esters of saturated carboxylic acids having 1 to 18 carbon atoms and vinyl alkyl esters wherein the alkyl group contains 1 to 18 carbon atoms; and

(b) 2 to 20 weight percent based on the copolymer of a blowing agent curative selected from the group consisting of mono- and polyazoformamide compounds, sulfonyl hydrazide compounds, sulfonyl semicarbazide compounds and dinitrosomethyleneamine compounds.

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**4,391,923**

**LOW DENSITY CLOSED-CELL FOAMED ARTICLES FROM ETHYLENE COPOLYMER/VINYL OR VINYLIDENE HALIDE BLENDS**

**John Rys-Sikora, Bel Aire, Md., assignor to E. I. Du Pont de Nemours & Co., Wilmington, Del.**

**Filed Sep. 27, 1982, Ser. No. 424,449**

**Int. Cl.³ C08J 9/06; C08L 81/00**

**U.S. Cl. 521—96** **13 Claims**

1. A crosslinkable foamable composition comprising

(a) 5 to 95 weight percent based on polymer weight of a copolymer of

(i) ethylene;

(ii) 1 to 60 weight percent based on copolymer of a softening monomer selected from the group consisting of unsaturated mono- or dicarboxylic acids of 3–20 carbon atoms, esters of said unsaturated mono- or dicarboxylic acids, vinyl esters of saturated carboxylic acids where the acid group has 2–18 carbon atoms, vinyl alkyl ethers wherein the alkyl group has 1–18 carbon atoms, vinyl or vinylidene halides, acrylonitrile, methacrylonitrile, norbornene, alpha olefins of 3–12 carbon atoms and vinyl aromatic compounds; and

(iii) 1 to 30 weight percent based on copolymer of a member of the group consisting of carbon monoxide or sulfur dioxide;

(b) 5 to 95 weight percent based on polymer weight of a vinyl or vinylidene halide polymer; and

(c) 0.5 to 20 weight percent based on the blend of a chemical blowing agent

(d) from 0.2 to 5.0 percent based on the blend of a free-radical crosslinking agent.

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**4,391,924**

**HIGH TEMPERATURE THERMOBARRIER COMPOSITIONS**

**John R. Uram, Jr., Glendale, Ariz., assignor to Goodyear Aerospace Corporation, Akron, Ohio**

**Continuation-in-part of Ser. No. 306,261, Sep. 28, 1981, which is a continuation-in-part of Ser. No. 232,054, Feb. 5, 1981, Pat. No. 4,343,928, which is a continuation-in-part of Ser. No. 204,424, Nov. 6, 1980, Pat. No. 4,352,848, and Ser. No. 70,390, Aug. 28, 1979, Pat. No. 4,294,886, said Ser. No. 204,424, is a continuation-in-part of Ser. No. 70,390,. This application Oct. 22, 1982, Ser. No. 436,105**

**The portion of the term of this patent subsequent to Oct. 13, 1998, has been disclaimed.**

**Int. Cl.³ C08G 59/40**

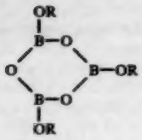
**U.S. Cl. 521—178** **23 Claims**

1. A high heat-resistant thermobarrier composition, comprising:

a blend having

(a) about 100 parts by weight of an epoxy resin;

(b) from about 5 to about 30 parts by weight of the boroxine having the formula



where R is a group having from 1 to 18 carbon atoms;

(c) from about 1 to about 10 parts by weight of a phenyl substituted alkyl alcohol, said alkyl alcohol having from 1 to 20 carbon atoms; and

(d) a heat-resistant filler, the amount of said filler being sufficient to form a thixotropic blend.

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**4,391,925**

**SHEAR THICKENING WELL CONTROL FLUID**

**Donald Mintz, Fort Lee, N.J., and Cyrus A. Irani, Monroeville, Pa., assignors to Exxon Research & Engineering Co., Florham Park, N.J.**

**Continuation of Ser. No. 79,437, Sep. 27, 1979, abandoned. This application Jun. 24, 1982, Ser. No. 391,812**

**Int. Cl.³ C08L** *3/34, 5/01;* **E21B** *33/13*

**U.S. Cl. 523—130** **28 Claims**

1. A shear thickening composite comprising:

(a) a water swellable clay capable of rapidly forming a high strength gel when mixed with water, said clay being present in said composite in sufficient quantity so as to form a gel having a strength of at least 2000 lb/100 $ft^2$;

(b) a first phase comprising water and water soluble polymer; and

(c) a second phase comprising oil and surfactant, the water in said first phase being kept separate from said clay by the intervening second phase, said intervening second phase remaining intact during low shear pumping of the composite, said intervening second phase rupturing during the application of high shear to the composite to enable mixing of the water in the first phase and the clay to form the high strength gel.

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**4,391,926**

**SOIL STABILIZERS AND THEIR PREPARATION**

**Hubert S. Creyf, Brugge, Belgium, assignor to S.A. PRB n.v., Woluwe-St.-Pierre, Belgium**

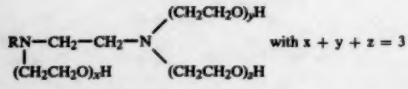
**Continuation of Ser. No. 83,710, Oct. 11, 1979, abandoned. This application Apr. 16, 1981, Ser. No. 254,686**

**Claims priority, application Belgium, Oct. 11, 1978, 191048**

**Int. Cl.³ C08L** *75/08*

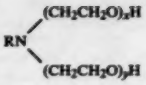
**U.S. Cl. 523—132** **28 Claims**

1. A soil stabilizer in the form of an aqueous composition which comprises water as a dispersion medium, a dispersed polyurea polymer, the polyol component of which consists of one or more polyols with hydrophobic and hydrophilic groups in a weight ratio between 30/70 and 90/10 and with an average molecular weight of 1500 to 6000 and a surface active product selected from the group consisting of: a compound of formula (I):



with x + y + z = 3

wherein R is an alkyl group with 12 to 16 carbon atoms; or a linear or ramified hydrocarbon sulfonate, optionally containing ethoxy units; or a compound of formula (II):



wherein R is an alkyl group with 12 to 16 carbon atoms and x+y=11, so that the average molecular weight is of the order of 700, said soil stabilizer being a stable, non-gel dispersion of particles of said polyurea polymer in said water.

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**4,391,927**

**ERASABLE INKS CONTAINING THERMOPLASTIC BLOCK COPOLYMERS**

**Robert F. Farmer, III, Rockville, Md., assignor to The Gillette Company, Boston, Mass.**

**Filed Nov. 5, 1981, Ser. No. 318,307**

**Int. Cl.³ C09D** *11/18;* **C08K** *5/01;* **C08L** *53/00*

**U.S. Cl. 523—161** **5 Claims**

1. An erasable ink for use in a ball-point writing instrument consisting essentially of a pigmented organic solvent solution containing a thermoplastic block copolymer having an arrangement of A (thermoplastic) and B (rubbery) blocks selected from the class consisting of ABA, $(AB)_nX$ and $(—A-B)—_n$; in which said thermoplastic blocks are selected from the class consisting of styrene, ester and urethane blocks; in which said rubbery blocks are selected from the class consisting of butadiene, isoprene and ethylene-butylene blocks; in which the ratio of said rubbery blocks to said thermoplastic blocks is from 60:40 to 90:10; in which the solubility parameter of said organic solvent is from about 7 to about 10.5; and containing an effective amount up to about 10% by weight of said solution of an additive to increase erasability selected from the class consisting of polybutenes and poly-alpha-methylstyrene.

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**4,391,928**

**OPACIFYING POLYMERIC PARTICLE AND USES**

**Daniel F. Herman, Princeton, and Uno Kruse, East Windsor, both of N.J., assignors to NL Industries, Inc., New York, N.Y.**

**Filed Sep. 4, 1981, Ser. No. 299,360**

**Int. Cl.³ C08L** *9/08*

**U.S. Cl. 523—201** **16 Claims**

1. A latex coating composition of improved opacity and film characteristics, said coating composition comprising discrete capsules comprising a solid polymeric core surrounded by a solid polymeric shell having a Tg less than about 45° C., wherein the weight ratio of said shell to the total weight of said capsule ranges from 0.25:1 to 0.5:1.

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**4,391,929**

**USEFUL SOLUTIONS OF THE TETRAMETHYLOL DERIVATIVE OF 4,4'ISO-PROPYLIDENEDIPHENOL**

**Thomas G. Harris, Lancaster, Pa., assignor to Armstrong World Industries, Inc., Lancaster, Pa.**

**Division of Ser. No. 339,123, Jan. 13, 1980, Pat. No. 4,357,457, which is a continuation-in-part of Ser. No. 178,722, Aug. 18, 1980, abandoned. This application Aug. 16, 1982, Ser. No. 408,670**

**Int. Cl.³ C08J** *9/32*

**U.S. Cl. 523—218** **2 Claims**

1. A foam produced by heating an acidified mixture of a solution comprising, in relative proportions, 10 parts by weight of the tetramethylol derivative of 4,4'iso-propylidenediphenol, about 15 to about 35 parts by weight water and about 5 to about 30 parts by weight of ethylene carbonate or propylene carbonate, with the total parts by weight of water and carbonate ranging from about 40 to about 45 with a surfactant and a blowing agent.

## 4,391,930
## STABILIZED SUSPENSION OF GLASS BUBBLES IN AN AQUEOUS DISPERSION OF TETRAFLUOROETHYLENE POLYMER

Allan H. Olson, Parkersburg, W. Va., assignor to E. I. DuPont de Nemours & Co., Wilmington, Del.

Continuation-in-part of Ser. No. 204,956, Nov. 7, 1980, abandoned. This application Feb. 11, 1982, Ser. No. 347,927
Int. Cl.³ C08J 9/32
U.S. Cl. 523—219 8 Claims

1. A stabilized suspension of glass bubbles in an aqueous dispersion of tetrafluoroethylene polymer, which suspension comprises

(a) water having dispersed therein 45–75% by weight, based on water, of a tetrafluoroethylene polymer having a melt viscosity of at least $1 \times 10^9$ poises at 380° C.,

(b) 5 to 10% by weight, based on polymer, of a nonionic surfactant,

(c) 0.1 to 0.5% by weight, based on water and polymer, of a water-soluble electrolyte, and

(d) 2 to 8% by weight, based on polymer, of glass bubbles having a density between 0.20 and 0.40 g/ml and an average size between 20 and 130 micron,

said dispersion having a viscosity between 135 and 300 cps at 25° C.

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## 4,391,931
## CAPSULES CONTAINING SELF-SETTING COMPOSITIONS AND THE COMPOSITIONS

Jeffrey G. Haigh, 31 Milton Dr., Newport Pagnell, Buckinghamshire, and Leslie W. Cheriton, 3 Meadow Way Wing, Leighton Buzzard, Bedfordshire, both of England

Filed Aug. 10, 1981, Ser. No. 291,852
Int. Cl.³ C08J 3/00
U.S. Cl. 523—318 13 Claims

1. A capsule containing in separate compartments the interactive components of a self-setting composition, one component comprising an unhardened resin and the other component comprising a hardener therefor, the capsule being rupturable to release the interactive components to intermix them and form the self-setting composition, at least one of the components beig flammable, both free water and hydrated salt being present, the free water or the hydrated salt or both being located in at least one of the components prior to the interaction thereof, the concentration of the free water and the hydrated salt being sufficient to supress the flame of the flammable component but still permitting the set composition to have a strength which exceeds 20 Newtons/mm$^2$.

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## 4,391,932
## POLYCATIONIC LATICES OF DIMETHYLAMINOPROPYL-ACRYLAMIDE, AND THEIR USE OF AS SLUDGE DEWATERING AGENTS AND/OR PAPER RETENTION AIDS

Wun T. Tai, Palos Hills, Ill., assignor to Nalco Chemical Company, Oak Brook, Ill.

Filed Jan. 22, 1982, Ser. No. 341,971
Int. Cl.³ C08J 3/02
U.S. Cl. 523—337 7 Claims

1. A water-in-oil emulsion of an acrylamide-dimethylaminopropylacrylamide copolymer having been prepared by the steps comprising:

A. forming a water-in-oil emulsion of an acrylamide-acrylonitrile copolymer, said water-in-oil emulsion containing:

a. 5–60% by weight acrylamide-acrylonitrile copolymer containing 1–50% by weight acrylonitrile;

b. 20–90% water;

c. 5–75% of an inert hydrophobic organic liquid; and

d. 0.1–21% water-in-oil emulsifying agent;

B. reacting said water-in-oil emulsion of the acrylamide-acrylonitrile copolymer with dimethylamino-propylamine in a molar ratio of dimethylaminopropylamine to acrylonitrile of from 1:1 to 0.1:1;

C. recovering a readily invertible water-in-oil emulsion of an acrylamide-dimethylaminopropyl acrylamide copolymer.

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## 4,391,933
## ELECTROPHORETIC COATING OF EPOXY RESINS FROM NON-AQUEOUS SYSTEMS

Luciano C. Scala, Murrysville, and Louis A. Cargnel, Unity Township, Westmoreland County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 22, 1980, Ser. No. 219,101
Int. Cl.³ C08K 5/07
U.S. Cl. 523—454 13 Claims

1. An emulsion for electrophoretically producing an insulating coating which comprises:

(a) about 8 to about 20 percent of a solvent as the discontinuous phase;

(b) about 0.5 to about 5 percent of an epoxy resin having an average molecular weight of at least 2000 disolved in said solvent;

(c) about 75 to about 90 percent of a ketone precipitant as the continuous phase; and

(d) an emulsifier in an amount sufficient to react with the epoxy and hydroxyl groups in said epoxy resin up to about 900 percent in excess of stoichiometric.

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## 4,391,934
## DRY TEXTILE WARP SIZE COMPOSITION

David J. Lesley, Greer, and Lawrence C. Davis, Jr., Spartanburg, both of S.C., assignors to ABCO Industries, Inc., Roebuck, S.C.

Filed Dec. 5, 1980, Ser. No. 213,328
Int. Cl.³ C08L 1/28, 3/00
U.S. Cl. 524—43 23 Claims

1. A dry textile warp size composition for yarns that contains synthetic or natural fibrous materials comprising a blend of a polyester resin, said resin including ionic hydrophilic groups therein, said resin further being at least substantially saturated, and in particulate form, and a film former, said blend being at least water dispersible and the particulate polyester resin in said blend being at least substantially non-adherent to adjacent polyester resin particles.

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## 4,391,935
## FLAME RETARDANT POLYCARBONATE COMPOSITION

Charles A. Bialous, Evansville; John B. Luce, Mt. Vernon, and Victor Mark, Evansville, all of Ind., assignors to General Electric Company, Mt. Vernon, Ind.

Continuation of Ser. No. 949,964, Oct. 10, 1978, abandoned, which is a continuation of Ser. No. 496,128, Aug. 9, 1974, abandoned. This application May 4, 1981, Ser. No. 260,300
Int. Cl.³ C08K 5/45
U.S. Cl. 524—82 3 Claims

1. A composition meeting UL-94 $V_o$ requirements consisting essentially of (1) a non-halogenated aromatic polycarbonate, (2) a flame retardant effective amount of an alkali metal or alkaline earth metal salt of an organic acid of the group

unsubstituted monomeric or polymeric aromatic sulfonic acids,

monomeric or polymeric aromatic sulfonesulfonic acids,

sulfonic acids of aromatic ketones,

heterocyclic sulfonic acids,

halogenated non-aromatic carboxylic acids,

sulfonic acids of aromatic sulfides,

monomeric or polymeric aromatic ether sulfonic acids,

aliphatic and olefinic sulfonic acids,

monomeric or polymeric phenol ester sulfonic acids,

unsubstituted or halogenated oxocarbon acids,

sulfonic acids of monomeric and polymeric aromatic carboxylic acids and esters,

halocycloaliphatic aromatic sulfonic acids,
monomeric or polymeric aromatic amide sulfonic acids,
monomeric or polymeric aromatic sulfonic acids,
(3) and a non-dripping effective amount of an ASTM Type 3 polytetrafluoroethylene.

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**4,391,936**

## MOLDING BLENDS

**Marion G. Waggoner, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 208,548, Nov. 20, 1980, abandoned. This application Aug. 11, 1982, Ser. No. 407,244**
**Int. Cl.³ C08L 77/02**
**U.S. Cl. 524—89** **3 Claims**

1. A polyamide molding blend consisting essentially of
(a) at least one polyamide of film-forming molecular weight,
(b) about 1–3 percent by weight of polyamide of carbon black, and
(c) between about 0.1–2 percent by weight of polyamide of nigrosine.

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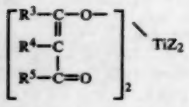
**4,391,937**

## COLOR STABLE CHELATED TITANATE COMPOSITIONS

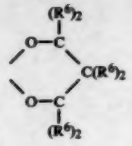
**James R. Falender, Sanford, and Angelika H. McHale, Midland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.**

**Filed Oct. 5, 1981, Ser. No. 308,704**
**Int. Cl.³ C08L 83/06**
**U.S. Cl. 524—119** **34 Claims**

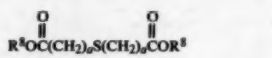
1. An elastomeric composition comprising (i) a hydroxyl endblocked polydiorganosiloxane, (ii) a silane or mixture of silanes having an average of from 2.01 to 4 inclusive alkoxy radicals, and a sufficient amount of a titanium-containing composition to yield from 0.1 to 10 parts by weight of chelated titanium compound based upon 100 parts by weight of the hydroxyl endblocked polydiorganosiloxane, said elastomeric composition being stable under conditions excluding moisture and curable by exposure to moisture, where said tatanium-containing composition comprise the product obtained by mixing, under conditions which substantially exclude moisture,
(a) a chelated titanium compound having a formula



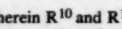
in which
$R^3$ is a monovalent hydrocarbon radical having from 1 to 18 inclusive carbon atoms,
$R^4$ is a monovalent radical selected from the group consisting of hydrocarbon radicals having from 1 to 18 carbon atoms, and hydrogen,
$R^5$ is a monovalent radical selected from the group consisting of hydrocarbon radicals and aliphatic hydrocarbonoxy radicals each having from 1 to 18 inclusive carbon atoms, and
Z is a radical selected from the group consisting of monovalent aliphatic hydrocarbonoxy radicals and monovalent acyloxy radicals, each having from 1 to 18 inclusive carbon atoms; hydroxyl radical; divalent oxygen atoms forming a TiOTi linkage; and when taken together form an alkanedioxy radical of the formula



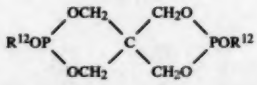
in which
$R^6$ is a radical selected from the group consisting of hydrogen atom and monovalent aliphatic hydrocarbon radicals having not more than 8 carbon atoms, the total number of carbon atoms in the alkanedioxy radical is not more than 18, and
(b) from 1 to 100 parts by weight based on 100 parts by weight of (a), of an additive soluble in the chelated titanium compound and being selected from the group consisting of
(1) an ester of thioalkanoic acid of the formula



wherein $R^8$ is an alkyl group containing from 1 to 15 inclusive carbon atoms and a is an integer of from 1 to 4 inclusive,
(2) di-tertiary-butyl phenol containing compounds selected from the group consisting of 2,6-di-tert-butyl-4-methylphenol, tetrakis[methylene-3-(3',5'-di-tert-butyl4'-hydroxyphenyl)propionate]methane, octadecyl-3-(3',5'-di-tert-butyl-4'-hydroxyphenyl)propionate, 4,4'-methylenebis(2,6-di-tert-butylphenol), 1,6-hexamethylene-bis-(3,5-di-tert-butyl-4-hydroxyhydrocinnamate), and thiodiethylenebis-(3,5-di-tert-butyl-4-hydroxy hydrocinnamate),
(3) an organic phosphite selected from the group consisting of the formula



wherein $R^{10}$ and $R^{11}$ are selected from the group consisting of linear or branched alkyl radicals of from 1 to 18 carbon atoms, and phenyl radical, wherein b is 0 or 1, and the formula



wherein $R^{12}$ is a linear or branched alkyl radical of from 1 to 18 carbon atoms, and
(4) a mixture of (2) and (3), the composition having a color of less than 13 as determined by the Gardner Color Scale and being stored under conditions substantially excluding moisture.

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**4,391,938**

## POLYETHYLENE TEREPHTHALATE COMPOSITIONS HAVING IMPROVED CRYSTALLIZATION RATE AND SURFACE APPEARANCE

**Nazir A. Memon, Fallsington, and Cielo S. Myers, Holland, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.**

**Filed Feb. 16, 1982, Ser. No. 349,215**
**Int. Cl.³ C08K 3/40, 5/11; C08G 63/70**
**U.S. Cl. 524—270** **11 Claims**

1. Composition comprising polyethylene terephthalate and from about 1 to about 10% by weight of an additive, based on

polyethylene terephthalate and additive, said additive being present to promote crystallization rate and improve surface appearance, said additive being selected from the group consisting of monomeric esters of citric acid and epoxidized esters of unsaturated aliphatic carboxylic acids.

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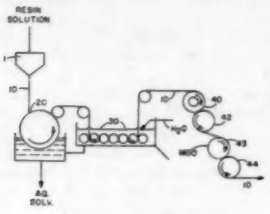
**4,391,939**

## POLYMER FILM TREATMENT WITH ORGANIC IMPREGNANT

**Gordon P. Hungerford, Palmyra, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Apr. 17, 1981, Ser. No. 255,029**
**Int. Cl.³ B29C 25/00**
**U.S. Cl. 524—377** **9 Claims**




1. A self-supporting uniform film consisting essentially of
(a) biaxially-oriented high nitrile addition polymer containing at least 80% acrylonitrile repeating units; and
(b) dispersed in the polymer triethylene glycol in sufficient amount to plasticize the polymer and substantially increase film toughness.

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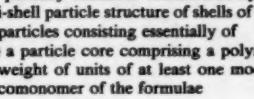
**4,391,940**

## FLUOROPOLYMERS WITH SHELL-MODIFIED PARTICLES, AND PROCESSES FOR THEIR PREPARATION

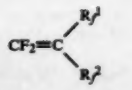
**Jürgen Kuhls, Burghausen; Franz Mayer, and Herbert Fitz, both of Burgkirchen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany**

**Continuation of Ser. No. 214,464, Dec. 8, 1980, abandoned. This application Mar. 16, 1982, Ser. No. 358,828**
**Claims priority, application Fed. Rep. of Germany, Dec. 12, 1979, 2949907**
**Int. Cl.³ C08L 27/18**
**U.S. Cl. 524—458** **14 Claims**

1. Aqueous polymer dispersion containing colloidal particles of a partially modified tetrafluoroethylene polymer with a multi-shell particle structure of shells of different composition, said particles consisting essentially of
(a) a particle core comprising a polymer of 0.05 to 6% by weight of units of at least one modifying fluoro-olefinic comonomer of the formulae




wherein $R_1$ is H, Br or Cl; $R_2$ is F or $R_f^1$, $R_f^1$ denoting a perfluoroalkyl radical with 1 to 4 C atoms; and $R_3$ is $R_1$ or $R_2$;




wherein $R_f^1$ is a perfluoroalkyl radical with 1 to 4 C atoms and $R_f^2$ is F or a perfluoromethyl radical;

$$R_f^3—O—CF=CF_2 \qquad (a^3)$$

wherein $R_f^3$ is a perfluoroalkyl radical with 1 to 5 C atoms; or

$$R_4—O—CF=CF_2 \qquad (a^4)$$

wherein $R_4$ is a radical $XCF_2—(CF_2)_m—$ in which X is H or Cl and m denotes an integer from 0 to 4, and units of tetrafluoroethylene, the proportion of the particle core being 5 to 20% by weight of the total particle,
(b) an inner particle shell, immediately adjacent to the particle core, of a polymer consisting of tetrafluoroethylene units, and
(c) an outer particle shell, immediately adjacent to the inner particle shell, of a polymer comprising 0.1 to 15% by weight of units of at least one modified, fluoro-olefinic comonomer of the formulae ($a^1$), ($a^2$), ($a^3$), and ($a^4$), these formulae being as defined under (a), and units of tetrafluoroethylene, the weight ratio of the inner particle shell to the outer particle shell being 75:25 to 99.5:0.5.

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**4,391,941**

## STABILIZED POLYPROPYLENE COMPOSITIONS

**George R. Cotten, Lexington, and Avrom I. Medalia, Newton, both of Mass., assignors to Cabot Corporation, Boston, Mass.**

**Continuation-in-part of Ser. No. 87,744, Oct. 24, 1979, abandoned. This application Sep. 18, 1981, Ser. No. 303,706**
**Int. Cl.³ C08K 3/04**
**U.S. Cl. 524—495** **6 Claims**

1. A composition of matter having improved resistance to the harmful effects of visible and ultraviolet light comprising a thermally stabilized polypropylene and as a light stabilizer for the composition a furnace carbon black which has been heat treated at a temperature of from about 1200° to about 3000° C. under a non-oxidizing atmosphere, said light stabilizer being present in amounts of from about 0.1 to about 2.0 percent by weight based on the weight of the thermally stabilized polypropylene.

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**4,391,942**

## VIBRATION-INSULATING RUBBER COMPOSITION

**Hideo Nakauchi, Yokohama; Shingo Kato, Tokyo, and Yukio Ando, Yokohama, all of Japan, assignors to Bridgestone Tire Co., Ltd., Tokyo, Japan**

**Filed Apr. 6, 1982, Ser. No. 366,084**
**Int. Cl.³ C08K 3/04, 5/01**
**U.S. Cl. 524—526** **11 Claims**

1. A vibration-insulating rubber composition comprising:
45 to 75 parts by weight of at least one rubber selected from the group consisting of natural rubber, isoprene rubber, butadiene rubber and styrene-butadiene rubber having a styrene content of about 23%;
40 to 20 parts by weight of a halogenated butyl rubber;
5 to 15 parts by weight of a copolymer having a styrene content of not less than 50%;
20 to 80 parts by weight of carbon black, based on 100 parts by weight of the total of the above rubbers and copolymer; and
3 to 25 parts by weight of an aromatic process oil, based on 100 parts by weight of the total of the above rubbers and copolymer.

**4,391,943**

## UV STABILIZED NYLON 6

**Howard A. Scheetz, Lancaster, Pa., assignor to The Polymer Corporation, Reading, Pa.**

**Filed Jan. 4, 1982, Ser. No. 336,713**
**Int. Cl.³ C08K 3/04; C08L 67/00, 77/00**
**U.S. Cl. 524—538** **2 Claims**

1. A UV stabilized nylon 6, a polymer of caprolactam, containing about 0.5% to 5.0% carbon black, the improvement comprising the addition of from 5% to 50% by weight of a polyester elastomer.

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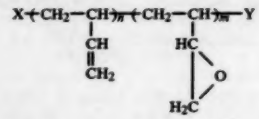
**4,391,944**

## VINYL CHLORIDE COPOLYMER AND COMPOSITION CONTAINING THE SAME

**Kazumasa Yamane, Kobe; Masahiro Kobayashi, Amagasaki, and Masaniko Takada, Akashi, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan**

**Division of Ser. No. 210,858, Nov. 26, 1980, Pat. No. 4,363,903.**
**This application Sep. 15, 1981, Ser. No. 302,470**
**Claims priority, application Japan, Nov. 30, 1979, 54-155874; Dec. 4, 1979, 54-157296**
**Int. Cl.³ C08K 5/09, 5/10, 5/49**
**U.S. Cl. 524—548** **1 Claim**

1. A composition comprising (A) a copolymer prepared by polymerizing a reaction system comprising a monomeric mixture of (a) vinyl chloride or a mixture of at least 50% by weight vinyl chloride and a monomer copolymerizable therewith and (b) 0.001 to 10 parts by weight per 100 parts by weight of the monomeric component (a) of a compound having the following general formula:



wherein

X and Y are independently hydrogen, hydroxyl or carboxyl,

n is an integer of 2 to 100 and m is 0 or an integer of 1 to 80,

the polymerization being carried out employing a free-radical polymerization initiator; and

(B) 25 to 200 parts by weight of a plasticizer per 100 parts by weight of said copolymer, the composition giving a molding having a compression set of not more than 50% and a tensile strength of not less than 1.30 kg/mm².

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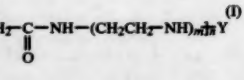
**4,391,945**

## CHELATE RESIN PREPARED BY REACTING BUTANE-1,2,3,4-TETRA-CARBOXYLIC ACID OR ANHYDRIDE WITH POLYETHYLENE POLYAMINE

**Fujio Mashio, and Shuji Kitamura, both of Kyoto, Japan, assignors to Mitsi Toatsu Inorganic Chemicals, Inc., Tokyo, Japan**

**Filed Apr. 7, 1981, Ser. No. 251,789**
**Claims priority, application Japan, Apr. 10, 1980, 55-47699**
**Int. Cl.³ C08G 69/26**
**U.S. Cl. 524—600** **31 Claims**

1. A resin having the formula (I):



(I)

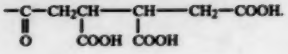
wherein,

m stands for an integer of 2 to 6 or for a mixture having an average value of 4 to 5,

n stands for a mixture having an average value of 4 to 10,

X stands for —OH or —NH—$CH_2CH_2)_mNH_2$, and

Y signifies H or



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**4,391,946**

## FURAN POLYMER CONCRETE

**Denis W. Akerberg, Huntley, and David D. Watson, Barrington, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.**

**Filed Nov. 18, 1981, Ser. No. 322,489**
**Int. Cl.³ C08L 45/00**
**U.S. Cl. 524—849** **9 Claims**

1. A polymer concrete for use in a corrosive environment comprising a nonalkaline aggregate, a furan binder having a viscosity less than 15 cps at 25° C. and an acidic catalyst, wherein said furan binder comprises furfuryl alcohol, a silane and less than 25 percent by weight based on the weight of the furan binder of a cross-linking monomer selected from the group consisting of bis-phenol A, furfural, resorcinol, hydroxymethylfuran, and bis-hydroxymethylfuran.

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**4,391,947**

## LOW VISCOSITY POLYESTER COATING COMPOSITIONS

**Daniel R. Sassano, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Nov. 6, 1980, Ser. No. 204,442**
**Int. Cl.³ C08L 67/06**
**U.S. Cl. 525—11** **6 Claims**

1. A fluid, thermally stable, solventless, insulating composition, useful as a dipping and impregnating resin, consisting essentially of:

(1) 100 parts by weight of a polyester composition consisting of the admixture of:

(A) about 15 mole % to about 40 mole % of unsaturated cyclic dicarboxylic acid selected from the group consisting of isophthalic acid, tetrahydrophthalic acid, endo methylene tetrahydrophthalic acid, their anhydrides and their mixtures;

(B) 5 mole % to 20 mole % of an unsaturated aliphatic dicarboxylic acid;

(C) about 35 mole % to about 60 mole % of neopentyl glycol as sole aliphatic dihydric alcohol;

(D) 25 mole % to 35 mole % of copolymerizable unsaturated vinyl monomer;

(E) from 0 mole % to about 20 mole % of tris (2 hydroxy alkyl) isocyanurate, where alkyl is from 2 to 6 carbon atoms; and

(F) an active, dual inhibiting agent combination consisting of:

(i) 200 ppm. to 300 ppm. hydroquinone, and

(ii) 60 ppm. to 120 ppm. mono tert butyl hydroquinone and including an effective amount of solubilizer for the inhibiting combination; said polyester composition having a viscosity of from about 500 cps. to about 1,750 cps. at 25° C.; and

(2) from 0 parts to about 10 parts by weight of a melamine-formaldehyde compound.

4,391,948

## EMULSION/SUSPENSION ASA GRAFT COPOLYMERS AS FLOW MODIFIERS FOR PVC

John C. Falk, Northbrook, Ill., and Mike S. D. Juang, Vancouver, Wash., assignors to Borg-Warner Chemicals, Inc., Parkersburg, W. Va.

Filed Jun. 25, 1982, Ser. No. 392,423
Int. Cl.³ C08L 27/06, 51/04
U.S. Cl. 525—57 2 Claims

1. A composition comprising polyvinyl chloride (PVC) and an acrylonitrile-styrene-poly(butyl acrylate) (ASA) graft copolymer wherein said ASA graft copolymer is prepared by polymerizing acrylonitrile and styrene monomers in the presence of an emulsion of poly(butyl acrylate) and from 0.1 to about 1.0 parts per 100 parts of graft polymer of a mixture of polyvinyl pyrrolidone (PVP) and polyvinyl alcohol (PVA) in the ratio of from about 1 to 4 parts of PVP to about 4 to 1 parts of PVA, thereby converting the polymerization system from an emulsion to a suspension.

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4,391,949

## ASYMMETRIC BLOCK COPOLYMERS AND CORRESPONDING ADHESIVE FORMULATIONS

David J. St. Clair, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 12, 1981, Ser. No. 320,233
Int. Cl.³ C08L 9/00
U.S. Cl. 525—99 17 Claims

1. A block copolymer having the star-shaped, asymmetrical structure

$$(A—B)_xY—C)_z$$

where A is a polymer block of a monoalkenyl arene, B is a polymer block of a conjugated diene, C is a polymer block of a conjugated diene, Y is the residue of a multifunctional coupling agent, the sum of x plus z is greater than 6 and less than about 25, the ratio of x to z is between about 5 to 1 and about 1 to 5, the molecular weight of each block A is between about 3,000 and about 30,000, the molecular weight of each block B is between about 15,000 and about 100,000, and the molecular weight of each block C is between about 15,000 and about 100,000.

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4,391,950

## POLYPHENYLENE ETHER COMPOSITION AND PROCESS FOR PRODUCTION

Glenn D. Cooper, Delmar, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Filed Sep. 2, 1981, Ser. No. 298,534
Int. Cl.³ C08G 65/44
U.S. Cl. 525—132 16 Claims

1. A thermoplastic composition having improved color properties, comprising the reaction product of polyphenylene ether with a minor amount of benzoic anhydride sufficient to improve the color or the color stability.

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4,391,951

## NYLON 6 WITH IMPROVED WEAR LIFE

Howard A. Scheetz, Lancaster, Pa., assignor to The Polymer Corporation, Reading, Pa.

Filed Jan. 4, 1982, Ser. No. 336,712
Int. Cl.³ C08L 67/02, 77/02
U.S. Cl. 525—166 4 Claims

1. A molding composition comprising a melt blend of:
a major weight amount of nylon 6, a polymer of caprolactam, and
2 to 5 weight percent amount of a polyolefin, 2 to 5 weight percent of a polyfluorocarbon and 5 to 46 weight percent of a polyester elastomer.

4,391,952

## ANTI-STATIC MATERIAL AND METHOD OF MAKING THE MATERIAL

William Lybrand, Northridge, Calif., assignor to Bengal, Inc., Sepulveda, Calif.

Filed Dec. 4, 1981, Ser. No. 327,485
Int. Cl.³ C09K 3/16
U.S. Cl. 525—333.7 7 Claims

1. In combination for eliminating static charges by providing a resistivity of approximately $10^6$ to $10^9$ ohms,
a polyethylene of high specific gravity,
copper acetate dispersed in the polyethylene in a weight of approximately 24 grams per 100 pounds of polyethylene, and
an ethoxylated amine dispersed in the polyethylene in a weight of approximately 1,044 grams per 100 pounds of polyethylene.

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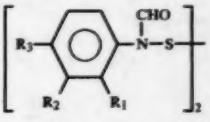
4,391,953

## DIENE RUBBER COMPOSITIONS CONTAINING N,N'-DITHIOFORMANILIDE CROSSLINKERS

Eiichi Morita, Copley, Ohio, assignor to Monsanto Company, St. Louis, Mo.

Filed Sep. 8, 1981, Ser. No. 299,891
Int. Cl.³ C08C 19/20
U.S. Cl. 525—351 7 Claims

1. A composition comprising diene rubber and a cross-linking amount of a compound of the formula




wherein $R_1$, $R_2$, and $R_3$ are the same or different substituents selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, chlorine and $CF_3$.

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4,391,954

## THERMOPLASTIC MOLDING COMPOSITION

Steven W. Scott, Evansville, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Continuation of Ser. No. 750,512, Dec. 14, 1976, abandoned. This application Mar. 12, 1981, Ser. No. 243,142
Int. Cl.³ C08L 67/02
U.S. Cl. 525—439 5 Claims

1. A compatible composition consisting essentially of
(a) a nonhalogenated aromatic polycarbonate derived from bisphenol-A and
(b) a polyester component consisting of amorphous polyester solely derived from a cyclohexanedimethanol and a mixture of iso and terephthalic acids.

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4,391,955

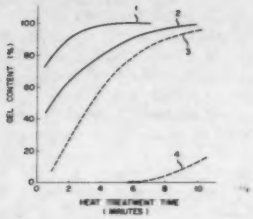
## PROCESS FOR CROSSLINKING POLYCARBONATE RESINS

Hisako Hori, Tokyo; Nobu Kitamura, Hiratsuka; Isao Shirahata, Chigasaki, and Nobuyuki Nakamura, Fujisawa, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Jan. 20, 1982, Ser. No. 340,973
Claims priority, application Japan, Feb. 5, 1981, 56-16018
Int. Cl.³ C08L 69/00
U.S. Cl. 525—462 20 Claims

1. A process for crosslinking a polycarbonate resin comprising heating a mixture comprising (1) a polycarbonate resin selected from the group consisting of (i) polycarbonate obtained (a) by the dehydrochlorination of a dihydroxyphenyl

alkane with phosgene, or (b) by an ester interchange of a dihydroxyphenyl alkane with diphenyl carbonate, and (ii) a polymer composition containing said polycarbonate as a major component thereof, at a temperature higher than the glass




transition point of said polycarbonate resin and (2) an organic copper compound which is compatible with said polycarbonate resin, the amount of said organic copper compound being sufficient to catalyze the crosslinking of said polycarbonate resin.

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**4,391,956**

## IMPACT MODIFIED NYLON 6

**Howard A. Scheetz, Lancaster, Pa., assignor to The Polymer Corporation, Reading, Pa.**

**Filed Jan. 4, 1982, Ser. No. 336,714**
**Int. Cl.³ C08L 67/02, 77/02**
**U.S. Cl. 525—425** **2 Claims**

1. A method of improving the impact properties of nylon 6, a polymer of caprolactam, which comprises melt blending the nylon with 5% to 50% by weight of a polyester elastomer.

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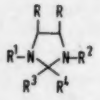
**4,391,957**

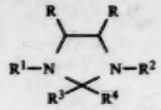
## ELASTICIZED ADDITION PRODUCT BASED ON POLYALKYLENE ETHER-POLYOLS AND POLYISOCYANATES, PREPARATION AND USE THEREOF

**Wilhelm Becker, Hamburg, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Filed Jul. 19, 1982, Ser. No. 399,791**
**Claims priority, application Fed. Rep. of Germany, Jul. 21, 1981, 3128733**
**Int. Cl.³ C08G 18/38**
**U.S. Cl. 525—454** **9 Claims**

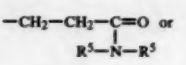


1. An elasticized addition product comprising
(a) a polyalkylene ether-polyol and
(b) a polyisocyanate wherein (a) has a molecular weight of 500 to 10,000 and 2 to 6 C atoms in the alkylene radical and the ratio of the NCO groups in the component (b) to the OH groups in the component (a) is 1,5:1 to 2,5:1, the addition product thereof is reacted further with a hydroxyl compound selected from the group consisting of
(c) an imidazolidine of the formula I



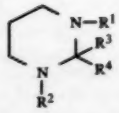
(I)

wherein R is hydrogen or alkyl having 1 to 4 C atoms, $R^1$ is
(c1) hydrogen,
(c2) hydroxyalkyl and alkyl having 1 to 12 C atoms in each case,
(c3) $—CH_2—R^5$,
(c4) $—CH_2—CH_2—COOR^5$,



(c5)

(c6) $—CH_2—CH_2—CN$
wherein $R^5$ represents in each hydroxyalkyl or alkyl having up to 8 C atoms, $R^2$ denotes
(c7) alkyl or alkylene having in each case 1 to 12 C atoms or denotes one of the radicals (c3) to (c6), $R^3$ and $R^4$ each denote hydrogen or alkyl having 1 to 5 C atoms or $R^3$ and $R^4$ together denote alkylene having 4 to 6 C atoms, and
(d) a hexahydropyrimidine derivative of the general formula



(II)

wherein $R^1$ to $R^5$ have the meaning as mentioned under (c), at least one of each of the substituents $R^1$ to $R^5$ in the formulae (I) and (II) carrying a hydroxyl group; the ratio of NCO groups to the OH groups of component (c) and (d) or a mixture thereof is approximately 1:1.

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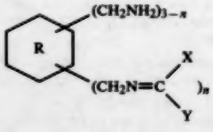
**4,391,958**

## ALDIMINES AND KETIMINES OF 1,3,5-(AMINOMETHYL)BENZENE OR CYCLOHEXANE AND THEIR USE AS CURING AGENTS FOR EPOXY AND POYLURETHANE RESINS

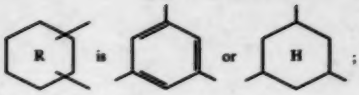
**Ichiro Minato, Osaka; Koichi Shibata, Ashiya, and Kimiya Fujinami, Takarazuka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

**Filed Nov. 17, 1981, Ser. No. 322,204**
**Claims priority, application Japan, Nov. 28, 1980, 55-168377**
**Int. Cl.³ C08G 18/83, 59/14; C07C 119/06**
**U.S. Cl. 525—504** **13 Claims**

1. A triamine derivative of the general formula:



wherein




X is hydrogen or a hydrocarbon radical of 1 to 8 carbon atoms; Y is a hydrocarbon radical of 1 to 8 carbon atoms; X and Y, together with their neighboring carbon atom, may form a 5- to 7-membered aliphatic hydrocarbon ring; and n is an integer of 1, 2 or 3.

13. An epoxy resin composition containing a triamine derivative according to claim 1 as a curing agent.

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**4,391,959**

## POLYMERIZATION OF ISOBUTYLENE

**Karl-Heinz Fauth, Wattenheim; Heinrich Mohr, Frankenthal, and Wolfgang Immel, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 238,594, Feb. 26, 1981, abandoned. This application Jan. 22, 1982, Ser. No. 341,875**

**Claims priority, application Fed. Rep. of Germany, Mar. 21, 1980, 3010870**

**Int. Cl.³ C08F *4/14***

**U.S. Cl. 526—70** **4 Claims**

1. A process for the preparation of polyisobutylene by polymerizing isobutylene in a polymerization zone which is at from 0° to −130° C. by means of from 0.01 to 1.0 percent by weight, based on isobutylene employed, of boron trifluoride catalyst, in the presence or absence of from 10 to 5,000 ppm, based on the weight of isobutylene employed, of molecular weight regulators and/or in the presence of from 10 to 5,000 ppm, based on the weight of isobutylene employed, of a primary or secondary alcohol as polymerization accelerator, and in the presence of from 30 to 90 percent by weight, based on isobutylene employed, of a low-boiling solvent which is inert under the reaction conditions, the solvent vaporized during the polymerization being drawn off continuously, liquefied and recycled, in the liquid state, to the polymerization zone, wherein a boron trifluoride catalyst which contains less than 0.3 percent by volume of silicon tetrafluoride is used and the solvent is recycled not less than twice during the continuous polymerization.

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**4,391,960**

## PROCESS FOR THE POLYMERIZATION OF VINYL HALIDE POLYMERS

**Willi Kleine, and Werner Frey, both of Burghausen, Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany**

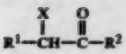
**Filed Jun. 4, 1981, Ser. No. 270,483**

**Claims priority, application Fed. Rep. of Germany, Jul. 3, 1980, 3025171**

**Int. Cl.³ C08F *2/20***

**U.S. Cl. 526—74** **11 Claims**

1. In the process for the polymerization of vinyl halide polymers comprising polymerizing at least one vinyl halide and, optionally, other olefinically-unsaturated monomers copolymerizable with vinyl halides, in an aqueous dispersion in the presence of free-radical-forming polymerization initators, dispersants and, other customary additives, in the presence of an inhibitor of polymer deposits and recovering said vinyl halide polymers, the improvement consisting essentially of adding to the reaction mixture from 10 to 1,000 ppm, based on the monomers, of at least one carbonyl compound having the formula:



wherein $R^1$ is selected from the group consisting of hydrogen and a straight or branched alkyl having from 1 to 9 carbon atoms; $R^2$ is selected from the group consisting of an alkoxy having from 1 to 9 carbon atoms, and an alkyl having from 1 to 9 carbon atoms; X is selected from the group consisting of hydroxy and $R^3$—CO—, wherein $R^3$ represents an alkyl having from 1 to 9 carbon atoms; as said inhibitor of polymer deposits.

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**4,391,961**

## PROCESS FOR PREPARING LIGHT COLORED PETROLEUM RESINS AND RESINS PRODUCED THEREBY (CS-203)

**Augustus B. Small; Vincent L. Hughes, and Francisco M. Benitez, all of Baton Rouge, La., assignors to Exxon Research & Engineering Co., Florham Park, N.J.**

**Filed Apr. 9, 1981, Ser. No. 252,434**

**Int. Cl.³ C08F *2/00, 10/100***

**U.S. Cl. 526—76** **4 Claims**

1. A process for producing a hydrocarbon resin of improved color and thermal stability which comprises heat soaking a petroleum cracking or reforming fraction containing cationically polymerizable hydrocarbons including from more than 0.5 to 2 weight percent of cyclodienes until the cyclodiene content is no more than 0.5 weight percent and the piperylene to cyclopentadiene weight ratio is above at least 50, distilling said heat soaked petroleum fraction, polymerizing said distilled petroleum fraction in the presence of an aluminum halide catalyst and recovering a resin having a Gardner color of no greater than 4 when measured on a solution of equal weights of said resin and toluene.

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**4,391,962**

## PROCESS FOR THE SUSPENSION (CO)POLYMERIZATION OF VINYL CHLORIDE

**Petrus H. M. Schreurs, Deventer, and Willem F. Verhelst, Gorssel, both of Netherlands, assignors to Akzona Incorporated, Asheville, N.C.**

**Filed Nov. 20, 1980, Ser. No. 208,616**

**Claims priority, application Netherlands, Nov. 30, 1979, 7908674**

**Int. Cl.³ C08F *2/20, 14/06***

**U.S. Cl. 526—200** **5 Claims**

1. An improved process for suspension polymerizing vinyl chloride in the presence of a radical initiator and at least two suspension stabilizers wherein the improvement comprises polymerizing the vinyl chloride in the presence of at least one primary stabilizer selected from the group consisting of water-soluble, partially hydrolyzed polyvinyl acetates and methyl hydroxypropyl cellulose and at least one secondary stabilizer selected from the group consisting of N-alkyl gluconamide wherein the alkyl group contains from about 16 to about 20 carbon atoms.

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**4,391,963**

## ORGANOPOLYSILOXANE PHOTOSENSITIZERS AND METHODS FOR THEIR PREPARATION

**Akihiko Shirahata, Ichihara, Japan, assignor to Toray Silicone Company, Ltd., Tokyo, Japan**

**Filed May 27, 1982, Ser. No. 382,504**

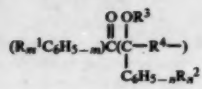
**Claims priority, application Japan, Jun. 18, 1981, 56-94130**

**Int. Cl.³ C08G *77/04***

**U.S. Cl. 528—37** **16 Claims**

1. An organopolysiloxane photosensitizer comprising an average of at least two siloxane units, of which at least an average of one siloxane unit per organopolysiloxane molecule

has the formula $Q_aR_b^5SiO_{(4-a-b)/2}$, wherein Q denotes a benzoin-containing group having the formula



$R^1$ and $R^2$ each denote, independently, a hydrogen atom, a halogen atom, a monovalent hydrocarbon group having from 1 to 10 carbon atoms, an alkoxy group, a thioalkoxy group, an amino group or a dialkylamino group; $R^3$ denotes a hydrogen atom or a monovalent hydrocarbon group having from 1 to 10 carbon atoms; $R^4$ denotes a divalent hydrocarbon group having from 2 to 10 carbon atoms; $R^5$ denotes a monovalent hydrocarbon group having from 1 to 10 carbon atoms or a halogenated monovalent hydrocarbon group; m is an integer of from 1 to 5, n is an integer of from 1 to 5, a is an integer of from 1 to 3, b is an integer of from 0 to 2 and a+b is an integer of from 1 to 3.

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**4,391,964**

## EMBEDDING MASS OF POLYURETHANE

**Gerhard Wick, Obernburg, and Helmut Schulze, Wuppertal, both of Fed. Rep. of Germany, assignors to Akzo NV, Arnhem, Netherlands**

**Filed Feb. 22, 1982, Ser. No. 351,140**

**Claims priority, application Fed. Rep. of Germany, Feb. 21, 1981, 3106498**

**Int. Cl.³ C08L *91/00*; C08G *18/75, 18/77***

**U.S. Cl. 528—74.5** **21 Claims**

1. Embedding mass of polyurethane produced on the basis of castor oil, composed of a polyurethane which has been obtained through reaction of an aromatic diisocyanate with a mixture of castor oil and trimethylolpropane into an NCO-group displaying pre-adduct and network polymerization of the pre-adduct with castor oil or a mixture of castor oil and trimethylolpropane, in the presence of catalyst, thereby characterized in that the embedding mass contains 7–700 ppm of a titanium alkylate compound, calculated as elemental titanium.

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**4,391,965**

## CURING AGENTS

**Hans R. Falkenburg, Haan; Siegfried Krause, Mettmann, and Robert C. McGuiness, Erkrath, all of Fed. Rep. of Germany, assignors to Imperial Chemical Industries PLC, London, England and Hermann Wiederhold G.m.b.H. Corp., Hilden, Fed. Rep. of Germany**

**Filed Oct. 26, 1981, Ser. No. 315,264**

**Claims priority, application Fed. Rep. of Germany, Oct. 27, 1980, 8034534**

**Int. Cl.³ C08G *59/42***

**U.S. Cl. 528—112** **9 Claims**

1. A coating composition which comprises in admixture

(a) a curing agent which is the reaction product of a polycarboxylic acid polyanhydride with a monohydroxy compound ROH, wherein R is alkyl, substituted alkyl, or aralkyl and

(b) a solution of an epoxy resin which is to be cured.

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**4,391,966**

## POLYMERS FROM PHENYLTEREPHTHALIC ACID

**John F. Harris, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

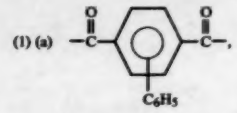
**Continuation-in-part of Ser. No. 102,040, Dec. 10, 1979, Pat. No. 4,294,955. This application Jul. 24, 1981, Ser. No. 286,559**

**The portion of the term of this patent subsequent to Oct. 13, 1998, has been disclaimed.**

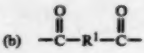
**Int. Cl.³ C08G *63/18***

**U.S. Cl. 528—176** **9 Claims**

1. Fiber forming melt-spinnable polyester that is optically anisotropic in the melt and consists essentially of recurring units having the structural formulas

(I) (a)  ,

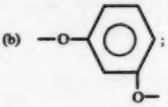
or a combination of (a) and up to 50 mole percent of

(b) 

wherein $R^1$ is 1,4-phenylene, 2,6-naphthylene, 4,4'-biphenylene, or a mixture of any thereof;

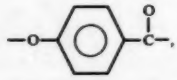
(2) (a) —O—$R^2$—O—

wherein $R^2$ is 1,4-phenylene, monochloro-, monophenyl-, or monoalkyl-1,4-phenylene wherein alkyl contains 1 to 4 carbon atoms, 2,6-naphthylene, 1,4-naphthylene, 4,4'-biphenylene or a mixture of any thereof, or a combination of (a) and up to 20 mole percent of

(b)  ;

and

(3) based on the total moles of (1) and (3), 25 to 80 mole percent of

 ,

the recurring diacid units (1) and recurring dioxy units (2) being present in substantially equimolar amounts.

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**4,391,967**

## POLYIMIDES-POLYAMIDES FROM TRICYCLO [4.2.1.$0^{2,5}$] NONANE-3,4-DIMETHYL-3,4,7,8-TETRACARBOXYLIC ACID DIANHYDRIDE AND DICARBOXYLIC ACIDS

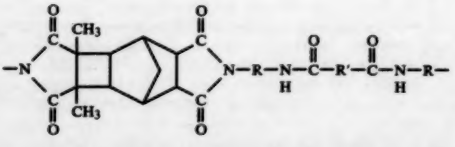
**Tayseer S. Nimry, Wheaton, and Ellis K. Fields, River Forest, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.**

**Continuation-in-part of Ser. No. 254,347, Aug. 19, 1981, Pat. No. 4,358,582. This application Sep. 29, 1982, Ser. No. 427,017**

**Int. Cl.³ C08G *73/14***

**U.S. Cl. 528—189** **8 Claims**

1. A polyimide-polyamide comprising the following recurring structure:



wherein R' is the same or different divalent aliphatic, cycloaliphatic, araliphatic or aromatic hydrocarbon radicals the term "R has the same meaning as R' or is an aromatic hydrocarbon

having from about 6 to about 10 carbon atoms joined directly or by a stable linkage selected from the group consisting of —O—, methylene,

—SO—, $—SO_2—$ or —S— radicals".

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**4,391,968**

**PROCESS FOR PREPARING POLYAMIDES HAVING A MODIFIED DYE AFFINITY**

**Gianfranco Merani, Vercelli, and Giuseppe Anzuino, Novara, both of Italy, assignors to Montedison S.p.A., Milan, Italy**

**Filed Feb. 20, 1981, Ser. No. 236,512**

**Claims priority, application Italy, Feb. 28, 1980, 20229 A/80**

**Int. Cl.³ C08G *69/04, 69/28***

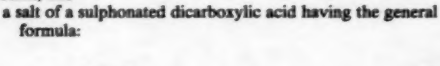
**U.S. Cl. 528—321** **10 Claims**

1. A process for preparing a fiber-forming polyamide having a modified dye affinity and no affinity for acid dyes and no affinity for basic dyes, which comprises polymerizing a composition of at least one polyamide-forming monomer and 1–45 millimols/kg monomer of a modifier composition consisting essentially of a mixture of a dicarboxylic acid having the general formula

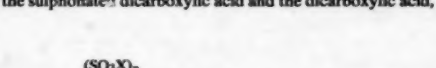
HOOC—R—COOH (I)

wherein R is a simple or simply substituted aromatic radical having 6 to 18 carbon atoms, cycloaliphatic radical having 4 to 18 carbon atoms, or an alkylene radical having 1 to 12 carbon atoums, and

a salt of a sulphonated dicarboxylic acid having the general formula:



wherein R has the meaning specified hereinabove, X is an alkali or alkaline earth metal or ammonium radical, and n is an integer from 1 to 4, in which the molar ratio between the salt of the sulphonated dicarboxylic acid and the dicarboxylic acid,



ranges from 0.01 to 1.

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**4,391,969**

**MODIFIED SULFUR CEMENT**

**William C. McBee, and Thomas A. Sullivan, both of Boulder City, Nev., assignors to The United States of America as represented by the Department of Commerce, Washington, D.C.**

**Continuation-in-part of Ser. No. 196,172, Oct. 14, 1980, Pat. No. 4,348,313, which is a continuation-in-part of Ser. No. 85,450, Oct. 16, 1979, Pat. No. 4,311,826. This application May 22, 1981, Ser. No. 266,484**

**The portion of the term of this patent subsequent to Jan. 19, 1999, has been disclaimed.**

**Int. Cl.³ C08G *75/16***

**U.S. Cl. 528—389** **8 Claims**

1. A modified sulfur cement formulation, consisting essentially of:

the polymeric reaction product of sulfur with from 2 to 20 wt. % of a cyclopentadiene oligomer mixture-dicyclopentadiene containing modifier, said cyclopentadiene oligomer mixture being free of dicyclopentadiene, wherein the cyclopentadiene oligomer mixture content of said modifier is at least 37 wt. %, said sulfur cement product having a softening point ranging up to 116° C.

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**4,391,970**

**PROCESS FOR PREPARING COLORLESS HYDROXYL EPIHALOHYDRIN POLYMERS**

**Yoshihisa Okamoto, Sagamore Hills, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio**

**Filed May 6, 1982, Ser. No. 375,243**

**Int. Cl.³ C08G *65/24, 65/28, 65/30***

**U.S. Cl. 528—408** **7 Claims**

1. In a process for the manufacture of hydroxyl-terminated polymers which comprises polymerizing an epihalohydrin in the presence of from about 0.03 part to 15.0 parts by weight of water or polyol, based on 100 parts by weight of the epihalohydrin, and catalytic amounts of a trialkyl oxonium salt of an $HMF_6$ acid wherein M is an element selected from the group consisting of phosphorus, arsenic and antimony, the improvement comprising washing the polymer with an aqueous solution of an alkali metal carbonate, the amount of said metal carbonate being a molar excess over the amount of said catalyst, at a temperature of greater than 40° C., whereby there is obtained a clear, colorless, heat stable polymer having a pH of about 5 to 8.

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**4,391,971**

**COLOR IMPROVEMENT AND ACETALDEHYDE REDUCTION IN HIGH MOLECULAR WEIGHT POLYESTERS**

**Freddie L. Massey, Uniontown, and Douglas D. Callander, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Dec. 28, 1981, Ser. No. 334,769**

**Int. Cl.³ C08G *63/70***

**U.S. Cl. 528—481** **9 Claims**

1. The method of treating molten polyester resin which comprises heating said resin to a temperature of from 230° C. to about 300° C. and passing said resin through a molecular sieve.

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**4,391,972**

**CONTINUOUS REMOVAL OF RESIDUAL HYDROCARBONS FROM POLYOLEFINS**

**Karl Kaiser, Brühl, and Alexander Oborodnik, Erftstadt, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany**

**Continuation of Ser. No. 950,563, Oct. 12, 1978, abandoned. This application Apr. 2, 1981, Ser. No. 250,387**

**Claims priority, application Fed. Rep. of Germany, Oct. 19, 1977, 2746909**

**Int. Cl.³ C08F *6/10***

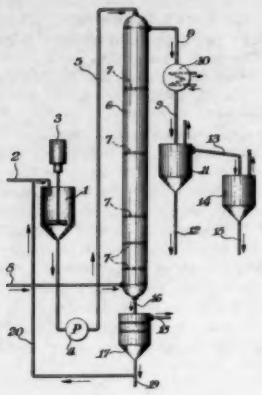
**U.S. Cl. 528—499** **9 Claims**

1. In a process for freeing polyolefins, selected from the group consisting of polyethylene and polypropylene made by catalytic polymerization of alpha-olefins in a hydrocarbon solvent having 6–11 carbon atoms and containing about 10 to 50 weight % residual hydrocarbons, from said residual hydrocarbons by mixing the hydrocarbon-containing polyolefin with water, agitating the mixture so as to convert it into a homogeneous dispersion containing 10 to 40 weight % of the polyolefin, contacting said dispersion countercourrently with steam, removing an aqueous polyolefin dispersion free from said hydrocarbons and separating the polyolefin from the water, the improvement which comprises:

(a) using surfactant-containing water having a surface tension of 50 to 68 dynes/cm., with respect to air, measured at 20° C. with said surfactant being ethoxylated stearic acid;

(b) subsequently introducing the homogeneous dispersion into the upper portion of a column with at least 5 sieve plates therein for contacting it with the steam, said sieve

plates having a free cross-sectional area increasing continuously from the lowermost to uppermost plate by about 3% up to 90% of the plate surface area and being arranged so as to be spaced from each other as intervals increasing



from the lowermost to the uppermost plate, the interval between the two uppermost plates being 10 times the interval between the two lowermost plates; and

(c) removing the aqueous polyolefin dispersion free from said hydrocarbons through said column's base portion.

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**4,391,973**

## READILY HYDRATABLE CELLULOSE AND PREPARATION THEREOF

**Mamerto M. Cruz, Jr., Pennington, N.J., assignor to Morca, Inc., Pennington, N.J.**

**Filed Aug. 17, 1981, Ser. No. 293,109**
**Int. Cl.³ C08B *1/00***
**U.S. Cl. 536—56** **9 Claims**

1. The method of producing water-insoluble cellulose particles that form floc-like slurries when mixed in water which comprises subjecting a mechanically fibrillated fibrillatable cellulose precursor to hydrolysis by the use of an aqueous solution of a non-derivatizing mineral acid and recovering water-insoluble, highly hydrated, floc-like cellulose particles.

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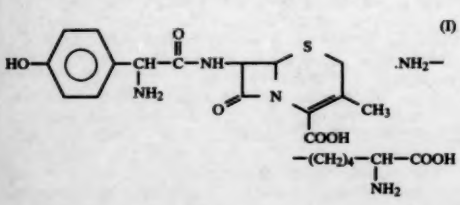
**4,391,974**

## WATER SOLUBLE CEPHADROXYL SALT

**Santiago A. Ciriza, and Carlos E. L. Padro, both of Barcelona, Spain, assignors to Liofilizaciones Esterilizaciones Y Sinthesis S.A., Barcelona, Spain**

**Filed Dec. 29, 1980, Ser. No. 220,286**
**Claims priority, application Spain, Feb. 5, 1980, 488286**
**Int. Cl.³ C07D *501/20*; A61K *31/545***
**U.S. Cl. 544—030** **1 Claim**

1. A water soluble salt of cephadroxyl or 7-[D(−)-alpha-amino-alpha-(4-hydroxyphenyl)-acetamido]-3-methyl-3-cephem-4-carboxylic acid having the formula:



(I)

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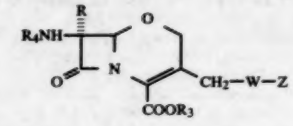
**4,391,975**

## PROCESS FOR 1-OXACEPHEM DERIVATIVES

**Saul Wolfe, Kingston, and Chia-Cheng Shaw, Montreal, both of Canada, assignors to Queen's University at Kingston, Kingston, Canada**

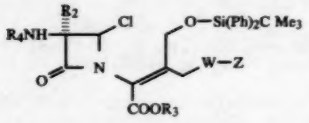
**Continuation-in-part of Ser. No. 330,838, Dec. 15, 1981, abandoned. This application Mar. 8, 1982, Ser. No. 356,236**
**Int. Cl.³ C07D *498/04***
**U.S. Cl. 544—90** **13 Claims**

1. A process for preparing a 1-oxacephem derivative of the formulr I



I

in which $R_4$ is hydrogen or a cleavable amino-protecting acyl group, or $R_4NH$ represents phthalimido, $R_3$ is hydrogen or a cleavable carboxy-protecting group, $R^2$ is hydrogen or methoxy, W is NH, O, or S and Z is selected from lower acyl groups and from five membered heterocycles containing 1–4 hetero atoms and optionally substituted with loweralkyl, which comprises treating a compound of the formula II



II

in which $R_4$, $R_3$, $R_2$, W and Z are as defined above with fluoride ions, and isolating the corresponding compound of formula I.

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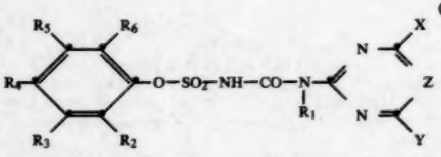
**4,391,976**

## PROCESS FOR PRODUCING ARYLSULFAMATES

**Beat Böhner, Binningen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

**Filed Oct. 19, 1981, Ser. No. 313,064**
**Int. Cl.³ C07D *251/46, 251/42, 239/42, 239/47***
**U.S. Cl. 544—211** **11 Claims**

1. A process for producing an N-(heterocyclo-amino-carbonyl)-arylsulfamate of the formula I



(I)

wherein

$R_1$ is hydrogen, methoxy or $C_1$–$C_3$-alkyl,

$R_2$ is hydrogen, fluorine, chlorine, bromine, nitro, $CF_3$, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy or $C_1$–$C_4$-alkoxycarbonyl,

$R_3$ is hydrogen, fluorine, chlorine, bromine, methyl or $C_1$–$C_4$-alkoxy,

$R_4$ is hydrogen, fluorine, chlorine, bromine, nitro, cyano, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy or $C_1$–$C_4$-alkoxycarbonyl,

$R_5$ is hydrogen, fluorine, chlorine, bromine, nitro or $CF_3$,

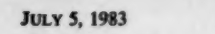
$R_6$ is hydrogen, fluorine, chlorine, bromine, $C_1$–$C_4$-alkyl or $C_1$–$C_4$-alkoxy,

X is $C_1$–$C_2$-alkyl, $C_1$–$C_3$-alkoxy, $C_1$–$C_2$-alkylthio, methoxymethyl, methoxyethyl, $CF_3$ or chlorine,

Y is $C_1$–$C_2$-alkyl, $C_1$–$C_3$-alkoxy, $C_1$–$C_2$-alkylthio, methoxymethyl or methoxyethyl, and

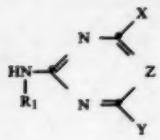
Z is the methine group or nitrogen,

which process comprises adding, in an inert organic solvent, chlorosulfonylisocyanate of the formula III



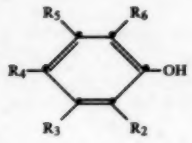
(III)

to an aminoheterocyclic compound of the formula II



(II)

wherein $R_1$, X, Y and Z have the meanings defined under the formula I; and subsequently reacting this mixture, optionally with the addition of an agent binding hydrogen chloride, with a phenol of the formula IV



(IV)

wherein $R_2$ and $R_3$ have the meanings given under the formula I.

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**4,391,977**

## ADENINE PRODUCTION

**Kju H. Shin, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.**

**Filed Dec. 16, 1981, Ser. No. 331,036**

**Int. Cl.³ C07D *473/34***

**U.S. Cl. 544—277** **10 Claims**

1. A process for producing adenine which comprises reacting hydrogen cyanide with formamide in the presence of an ammonium salt and a catalytic amount of methyldisulfide at elevated temperature and pressure.

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**4,391,978**

## PHENYL-QUINOLIZIDINES

**Rene Imhof, Gipf-Oberfrick, and Emilio Kyburz, Reinach, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**Continuation-in-part of Ser. No. 186,936, Sep. 12, 1980, abandoned. This application Apr. 9, 1981, Ser. No. 252,540**

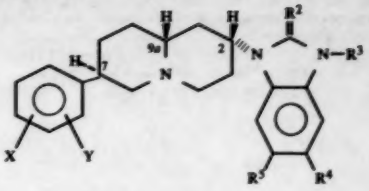
**Claims priority, application Switzerland, Apr. 11, 1980, 2784/80; Feb. 3, 1981, 701/81**

**The portion of the term of this patent subsequent to Nov. 25, 1997, has been disclaimed.**

**Int. Cl.³ C07D *455/02***

**U.S. Cl. 546—138** **5 Claims**

1. A compound of the formula

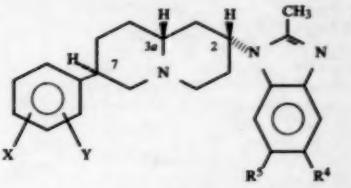


IV-1

wherein X is hydrogen, fluorine, chlorine, lower-alkoxy, lower-alkyl or trifluoromethyl; Y is hydrogen, fluorine, chlorine, lower-alkoxy, or lower-alkyl; $R^2$ is oxygen or sulfur; $R^3$ is hydrogen or lower-alkyl; and one of $R^4$ and $R^5$ is hydrogen and the other is bromine, iodine, cyano, lower-alkoxycarbonyl or sulfamoyl

in the form of its racemate or its enantiomers, as well as a pharmaceutically acceptable acid addition salt thereof.

5. A compound of the formula



IV-2

wherein X is hydrogen, fluorine, chlorine, lower-alkoxy, lower-alkyl or trifluoromethyl; Y is hydrogen, fluorine, chlorine, lower-alkoxy or lower-alkyl; and one of $R^4$ and $R^5$ is hydrogen and the other is bromine, iodine, cyano, lower-alkoxycarbonyl or sulfamoyl,

in the form of its racemate or its enantiomers, as well as a pharmaceutically acceptable acid addition salt thereof.

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**4,391,979**

## PROCESS FOR THE PREPARATION OF (2-AMINO-THIAZOL-4YL)-ACETIC ACID HYDROCHLORIDE

**Alfred Huwiler, and Leander Tenud, both of Visp, Switzerland, assignors to Lonza Ltd., Gampel, Valais, Switzerland**

**Filed Jan. 22, 1981, Ser. No. 227,489**

**Claims priority, application Switzerland, Feb. 18, 1980, 1284/80**

**Int. Cl.³ C07D *277/38***

**U.S. Cl. 548—194** **10 Claims**

1. Process for the preparation of (2-aminothiazol-4-yl)-acetic acid hydrochloride comprising suspending thiourea in water, adding 4-chloroacetoacetyl chloride, which is dissolved in a chlorohydrocarbon, to the suspension at a temperature of 5° to 10° C., and then completing the reaction at a temperature of 25° to 30° C., said (2-aminothiazol-4-yl)-acetic acid hydrochloride being in light-stable form, having a high degree of purity, and being stable both in solution and as a solid.

**4,391,980**

## ARYLOXYMETHYL OXAZOLINIUM DERIVATIVES

**Janos Zergenyi, Seltisberg, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.**

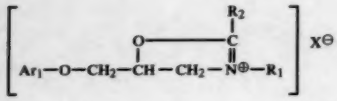
**Division of Ser. No. 58,222, Jul. 16, 1979, Pat. No. 4,294,966. This application May 11, 1981, Ser. No. 262,145**

**Claims priority, application Switzerland, Jul. 28, 1978, 8145/78**

**Int. Cl.³ C07D *263/14***

**U.S. Cl. 548—239** **7 Claims**

1. An optically active compound of the formula



(III)

wherein

$X^{\ominus}$ represents the anion of chlorine or bromine, or of sulfuric or phosphoric acid,

$Ar_1$ represents 1-naphthyl, 3-lower alkylphenyl, 2-lower alkenylphenyl, 2-lower alkenyloxyphenyl, 4-lower alkanoylaminophenyl, 4-(2-lower alkoxyethyl)-phenyl, benzyloxyphenyl or hydroxyphenyl,

$R_1$ represents lower alkyl, phenyl-lower alkyl or phenoxy-lower alkyl, and

$R_2$ represents lower alkyl, phenyl-lower alkyl or phenyl.

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**4,391,981**

## THIO BIS-LACTONE COMPOUNDS DERIVED FROM N-OCTENYL SUCCINIC ANHYDRIDE

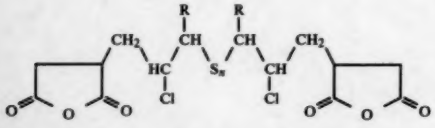
**Stanley J. Brois, Westfield, and Antonio Gutierrez, Hamilton Square, both of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.**

**Division of Ser. No. 167,481, Jul. 11, 1980, Pat. No. 4,302,395, which is a division of Ser. No. 967,289, Dec. 7, 1978, Pat. No. 4,221,720, which is a division of Ser. No. 806,326, Jun. 13, 1977, Pat. No. 4,167,514, which is a division of Ser. No. 726,206, Sep. 24, 1976, Pat. No. 4,062,786. This application Jul. 27, 1981, Ser. No. 287,136**

**Int. Cl.³ C07D *307/89***

**U.S. Cl. 549—252** **2 Claims**

1. A compound of the formula



wherein R is an n-pentyl group and n is 1 or 2.

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**4,391,982**

## INTERMEDIATES FOR THE PRODUCTION OF PICROPODOPHYLLIN AND RELATED COMPOUNDS AND PROCESSES FOR THE PREPARATION AND USE THEREOF

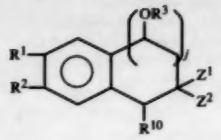
**Andrew S. Kende, Pittsford, N.Y.; Dennis P. Curran, Madison, Wis.; Margaret L. King, Rochester, and Neil A. Feldstein, Westbury, both of N.Y., assignors to The University of Rochester, Rochester, N.Y.**

**Division of Ser. No. 127,436, Mar. 5, 1980, Pat. No. 4,294,763. This application Mar. 25, 1981, Ser. No. 247,279**

**Int. Cl.³ C07D *317/44*; C07C *69/76***

**U.S. Cl. 549—433** **12 Claims**

1. A process for the preparation of a compound of the formula:



wherein;

$R^1$ represents alkoxy or aralkoxy,

$R^2$ represents hydrogen, alkoxy, aralkoxy, alkyl, or aralkyl, or $R^1$ and $R^2$ taken together represent the group —O—$CH_2$—O—,

j is an integer having a value of 0 or 1,

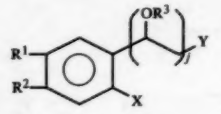
$R^3$ represents hydrogen, alkyl, aralkyl, acyl or a protecting group,

$Z^1$ represents a non-reacting electron withdrawing group which can be readily converted to a carboxyl group,

$Z^2$ represents a non-reacting electron withdrawing group which can be readily converted to a carboxyl group or hydrogen, and

$R^{10}$ represents hydrogen, alkyl, aryl, substituted aryl, or aralkyl;

which comprises treating a compound of the formula:



wherein:

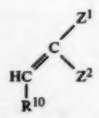
$R^1$, $R^2$, $R^3$ and j are as previously defined,

Y represents Cl, Br, I or a leaving group, and

X represents Cl, Br or I;

(A) initially with an alkyl lithium at a temperature of less than −40° C., and

(B) thereafter with a compound of the formula:



wherein:

$Z^1$, $Z^2$ and $R^{10}$ are as previously defined, followed by warming to a temperature of between about 0° C. and about 120° C.

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**4,391,983**

## CARBOXAMIDOESTERS

**Thomas Leigh, Alderley Edge, England, assignor to Imperial Chemical Industries PLC, London, England**

**Continuation of Ser. No. 803,237, Jun. 3, 1977, abandoned. This application Jul. 30, 1979, Ser. No. 62,190**

**Claims priority, application United Kingdom, Jun. 16, 1976, 24931/76; Jun. 16, 1976, 24932/76**

**Int. Cl.³ C07C *69/743***

**U.S. Cl. 560—124** **1 Claim**

1. (S)-α-carboxamido-3-(2,2-dichlorovinyloxy)benzyl (1R,3R)-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylate.

4,391,984

## ALKYNYL HALIDE COMPOUNDS AND ALKENYL ACETATE COMPOUNDS THEREFROM

Toshinobu Ishihara; Akira Yamamoto, and Kenichi Taguchi, all of Joetsu, Japan, assignors to Schin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed May 22, 1981, Ser. No. 266,614
Claims priority, application Japan, May 26, 1980, 55-69724; May 29, 1980, 55-71740
Int. Cl.³ C07C 67/10
U.S. Cl. 560—236 4 Claims

1. A method for the preparation of an alkenyl acetate having the general formula

$$R—CH=CH—CH_2)_nOCOCH_3$$

in which R is a monovalent hydrocarbon group and n is a number of 4, 5 or 6, which comprises the steps of

(a) reacting a Grignard reagent represented by the general formula

$$RMgX',$$

in which R has the same meaning as defined above and X' is a halogen atom, and an ω-halo-1-bromoalkyne compound represented by the general formula

$$X—CH_2)_nC≡C—Br,$$

in which X and n each have the same meaning as defined above, to form an alkynyl halide compound having the general formula

$$R—C≡C—CH_2)_nX,$$

in which R, X and n each have the same meaning as defined above,

(b) acetylating the alkynyl halide compound to form an alkynyl acetate compound having the general formula

$$R—C≡C—CH_2)_nOCOCH_3,$$

in which R and n each have the same meaning as defined above, and

(c) partially hydrogenating the alkynyl acetate compound in the presence of a Lindlar catalyst.

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4,391,985

## PROCESS FOR THE SEPARATION OF ISOPHTHALIC ACID FROM TEREPHTHALIC ACID

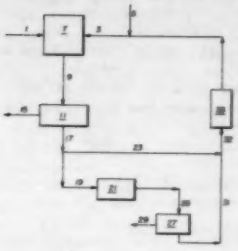
Richard J. Hook, Lexington, S.C., and Mark Rule, Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 16, 1981, Ser. No. 321,948
Int. Cl.³ C07C 51/16, 51/42
U.S. Cl. 562—414 14 Claims

1. A process for producing a terephthalic acid product of improved purity, said process comprising the steps of

(a) cooling at least a portion of a hot acetic acid production stream from which precipitated terephthalic acid has been removed so as to precipitate at least a portion of the isophthalic acid dissolved therein;

(b) removing the precipitated isophthalic acid and recycling said production stream to a reactor for the production of terephthalic acid, thereby rendering the total production stream unsaturated in isophthalic acid; and



(c) after reaction, recovering substantially pure terephthalic acid as a precipitate from said production stream.

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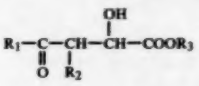
4,391,986

## PROCESS FOR PRODUCING THREO-3-AMINO-2-HYDROXYBUTANOYL-AMINOACETIC ACIDS, AS WELL AS NOVEL INTERMEDIATES THEREFOR AND PROCESS FOR PRODUCING THEM

Hamao Umezawa, Tokyo; Takaaki Aoyagi, Fujisawa; Tadashi Shirai, Musashino; Rinzo Nishizawa; Masao Suzuki, both of Tokyo, and Tetsushi Saino, Yono, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 96,693, Nov. 23, 1979, Pat. No. 4,281,180.
This application Nov. 28, 1980, Ser. No. 211,035
Claims priority, application Japan, Nov. 25, 1978, 53-145509; Dec. 13, 1978, 53-153157
Int. Cl.³ C07C 101/34
U.S. Cl. 562—444 3 Claims

1. Threo-3-protected amino-2-hydroxy-4-oxobutanoic acid or its esters represented by the formula:



wherein $R_1$ represents naphthyl or a group of the formula

in which $R_6$ and $R_7$ represent individually hydrogen, halogen, amino or an amino protected with acyl, lower alkyloxycarbonyl or carbamoyl, hydroxy or hydroxy protected with acyl, lower alkyloxycarbonyl or carbamoyl, lower alkoxy, lower alkyl or phenyl group; $R_2$ represents an amino protected with acyl, lower alkyloxycarbonyl or carbamoyl; and $R_3$ represents hydrogen, lower alkyl having 1 to 6 carbon atoms, or benzyl.

4,391,987

## PROCESS FOR THE PRODUCTION OF AQUEOUS SODIUM METHIONINATE SOLUTIONS

Manfred Spindler; Herbert Tanner, both of Hanau; Friedhelm Geiger, Erlensee; Friedrich Bittner, Bad Soden, and Jurgen Martens, Alzenau, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 10, 1982, Ser. No. 347,473

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1981, 3105007

Int. Cl.³ C07C *149/247*

U.S. Cl. 562—559 10 Claims

1. A process for the production of an aqueous sodium methioninate solution having a low content of sodium carbonate comprising forming a crude aqueous hydrolysis mixture by the saponification of 5-(β-methylmercaptoethyl)-hydantoin with 1.1 to 6 equivalents of sodium hydroxide, sodium carbonate or a mixture of sodium hydroxide and sodium carbonate, cooling the crude hydrolysis mixture to a temperature below 10° C., separating off the precipitated sodium carbonate and concentrating the sodium methioninate solution remaining to 40 to 65 weight percent.

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4,391,988

## PROCESS FOR THE PRODUCTION OF AQUEOUS SODIUM METHIONINATE SOLUTIONS

Manfred Spindler; Herbert Tanner, both of Hanau; Friedhelm Geiger, Erlensee; Friedrich Bittner, Bad Soden, and Jurgen Martens, Alzenau, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 10, 1982, Ser. No. 347,476

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1981, 3104997

Int. Cl.³ C07C *149/247*

U.S. Cl. 562—559 6 Claims

1. A process for the production of an aqueous sodium methioninate solution having a low content of sodium carbonate comprising forming a crude aqueous hydrolysis mixture by the saponification of 5-(β-methylmercaptoethyl)-hydantoin with 1.1 to 6 equivalents of sodium hydroxide, sodium carbonate, or a mixture of sodium hydroxide and sodium carbonate, distilling off water from the crude hydrolysis mixture until the sodium methioninate content is 40 to 65 weight percent, cooling to a temperature which is at most room temperature and then separating off the precipitated sodium carbonate.

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4,391,989

## OXYDEHYDROGENATION OF ISOBUTYRIC ACID AND ITS LOWER ALKYL ESTERS

Chelliah Daniel, Columbus, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.

Filed Nov. 9, 1981, Ser. No. 319,489

Int. Cl.³ C07C *51/377, 57/05, 67/317, 69/54*

U.S. Cl. 562—599 3 Claims

1. In a process for the catalytic conversion of isobutyric acid or a lower alkyl ester thereof to the corresponding α,B-olefinically unsaturated derivative by oxydehydrogenation wherein a catalyst is contacted with a gaseous feed stream containing said acid or ester and molecular oxygen at a temperature between 300° and 550° C.; the improvement comprising using as catalyst a material having the gram-atom empirical formula $Cr_aP_bW_cMo_dO_x$ wherein a is 0.01 to 1.0, b is 0.05 to 3.0, c is 0.01 to 3.0, d is 1 to 12.0, and x is determined by satisfying the sum of the unshared positive valences of the other elements shown in the formula.

4,391,990

## OXYDEHYDROGENATION OF ISOBUTYRIC ACID AND ITS LOWER ALKYL ESTERS

Ferdinand A. Ruszala, Columbus, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.

Filed Nov. 9, 1981, Ser. No. 319,354

Int. Cl.³ C07C *51/377, 57/05, 67/317, 69/54*

U.S. Cl. 562—599 3 Claims

1. A process for the catalytic conversion of isobutyric acid or a lower alkyl ester thereof to the corresponding α,β-olefinically unsaturated derivative by oxydehydrogenation wherein a catalyst is contacted with a gaseous feed stream containing said acid or ester and molecular oxygen at a temperature between about 300° and 500° C. which comprises using as catalyst a material having the gram-atom empirical formula $U_aW_bO_x$ wherein a is 1 to 3, b is 1 to 3, and x is determined by satisfying the sum of the unshared positive valences of the other elements shown in the formula.

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4,391,991

## PROCESS FOR THE PREPARATION OF PARA-FLUOROANILINE

Rudolph F. Mundhenke, North Tonawanda, and Michael J. Fifolt, Grand Island, both of N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Oct. 29, 1981, Ser. No. 316,199

Int. Cl.³ C07C *85/00*

U.S. Cl. 564—412 8 Claims

1. A process for the preparation of para-fluoroaniline comprising reacting N-phenylhydroxylamine with anhydrous hydrogen fluoride at atmospheric pressure and reflux conditions.

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4,391,992

## N-DENITRATION OF N,2,6-TRINITROANILINES WITH PHASE TRANSFER CATALYSTS

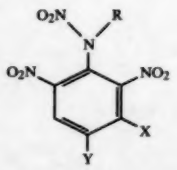
William A. Daniels, Belle Mead, and Rainer K. Zawadzki, Hopewell, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 69,451, Aug. 24, 1979, abandoned. This application Oct. 8, 1980, Ser. No. 195,264

Int. Cl.³ C07C *85/11, 76/02, 85/24, 85/26, 87/60, 87/62, 79/10, 79/12*

U.S. Cl. 564—441 7 Claims

1. A process for the N-denitration of a compound of formula:



wherein R is $C_1$–$C_6$ alkyl, $C_4$–$C_6$ cycloalkyl, $C_1$–$C_4$ monohaloalkyl or $C_1$–$C_4$ alkoxy($C_2$–$C_4$)alkyl; Y is $C_1$–$C_4$ alkyl, halogen or $CF_3$; X is hydrogen, halogen, $C_1$–$C_4$ alkyl, $C_1$–$C_4$ alkoxy, $C_1$–$C_4$ monohaloalkyl or $C_1$–$C_4$ alkoxy($C_1$–$C_4$) alkyl; comprising: reacting the compound with 0.15 to 4.0 molar amount of a phase transfer catalyst, wherein said catalyst is the moiety $R_n^1-Q^+.Z^-$, n is an integer of 2,3 or 4; wherein each $R^1$ may be the same or different and is selected from $C_1$–$C_{16}$ alkyl, $C_3$–$C_7$ cycloalkyl optionally substituted with $C_1$–$C_3$ alkyl, benzyl, substituted benzyl, phenyl, substituted phenyl and the substitutent is HO, halogen, $C_1$–$C_3$ alkyl, $C_1$–$C_3$ alkoxy, Q is N,P,As or S, Z is Cl, Br, I, $HSO_4$, $CH_3SO_4$, $H_2PO_3$ or $H_2PO_4$, or said catalyst is macrocyclic ethers, macrobicyclic ethers, polyethylene glycols of formula $HO—(CH_2CH_2O—)_m—CH_2CH_2OH$ and m is an integer of 40 to 50, mono and diesters of orthophosphonic acid with ethylene oxide

adducts, alkylpyridinium salts or substituted pyrazolium salts; in the presence of a water-immiscible solvent of ethylene dichloride, chloroform, monochlorobenzene or carbon tetrachloride; and in the presence of an aqueous solution of an alkali metal hydroxide or carbonate or ammonium hydroxide in amounts sufficient to maintain at least pH 7 throughout the reaction; and wherein the thus-obtained two-phase reaction mixture is agitated at reflux until the reaction is essentially complete.

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**4,391,993**

## THERMOLYSIS OF TETRAALKYLAMMONIUM BOROHYDRIDES TO BIS(TETRAALKYLAMMONIUM) DECAHYDRODECABORANES

**David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Feb. 12, 1982, Ser. No. 348,538**
**Int. Cl.³ C07F 5/02**
**U.S. Cl. 568—4** **5 Claims**

1. A process for the thermolysis reaction of tetraethylammonium borohydride to yield bis(tetraalkylammonium) decahydrodecaborane which comprises:

(i) combining $Et_4NBH_4$ in a mole ratio from about 0.3 to 1.0 with a boron-based solvent $Et_4NBH_3$ in a mole ratio from about 0.2 to 4.0 to form a reaction mixture, (wherein Et is $C_2H_5$), in a thermolysis reactor vessel having a plurality of outlets for various functions including an outlet for the introduction of reactants and an inert gas, an outlet through which the reaction temperature is monitored, and an outlet for discharging reaction products to a recovery system, said reactor vessel provided with an immersion oil heating means for heating including a temperature control means for controlling the reaction temperature, a means for maintaining an inert atmosphere of nitrogen over said reaction mixture, and a temperature measuring means for measuring temperature of the reaction mixture;

(ii) connecting one of said outlets of said reactor vessel to a recovery system comprised of a tube member having a heated tube section on one end to prevent any reflux action to said reaction vessel, and said tube member having an air-cooled condenser section on the other end of said tube member, said air-cooled condenser section being connected to a distillate receiver, said distillate receiver having a discharge outlet that is connected in series with a 0° C. cooled trap, a −78° C. cooled trap, a back pressure regulator, and a wet test gas meter; said cooled traps for collecting the condensable gases and said wet test gas meter for measuring the non-condensable gases;

(iii) introducing and maintaining an inert atmosphere of nitrogen in said reactor vessel and said recovery system;

(iv) heating said reaction mixture while stirring and controlling said reacting mixture to maintain a thermolysis temperature between about 175° C. and 186° C. for a reaction time from about 1 to about 2.5 hours until chemical reaction ceases;

(v) removing said reactor vessel from said immersion oil heating means, and cooling the residue in said reactor vessel to room temperature;

(vi) filtering off any remaining triethylamine borane solvent and recovering the filter cake;

(vii) washing said filter cake with hexane to remove any additional triethylamine borane; and

(viii) drying said washed filter cake to remove any hexane adhering to said filter cake to yield $(Et_4N)_2B_{10}H_{10}$.

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**4,391,994**

## PROCESS FOR THE PRODUCTION OF ETHERS

**Kiyoshi Kogoma, Chiba; Yu Ohashi, Ichihara; Jiro Niizeki, Chiba; Norio Sone, and Takashi Tobita, both of Ichihara, all of Japan, assignors to Nisso Petrochemical Industrie Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 161,930, Jun. 23, 1980, abandoned. This application Oct. 19, 1981, Ser. No. 312,781**
**Claims priority, application Japan, Jul. 4, 1979, 54/84686**
**Int. Cl.³ C07C 41/02**
**U.S. Cl. 568—593** **6 Claims**

1. A process for the production of glycol diethers, wherein a chain-type ether compound represented by the formula

$$R^1O-(CH_2)_m-O]_nR^2$$

wherein

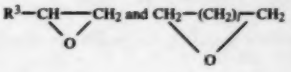
$R^1$ is an alkyl having 1 to 4 carbon atoms,

$R^2$ is an alkyl having 1 to 12 carbon atoms, phenyl, phenyl substituted by lower alkyl or lower alkoxy, or aralkyl consisting of lower alkylene and phenyl,

m is an integer from 1 to 4, and

n is an integer from 0 to 8

and an alkylene oxide compound selected from the group consisting of compounds represented by the formulas



wherein

$R^3$ is halogen-or non-substituted alkyl having 1 to 5 carbon atoms or phenyl, and

l is an integer from 0 to 5

are reacted in the presence of a catalyst prepared by mixing boron trifluoride and/or stannic chloride with an active-hydrogen compound selected from the group consisting of water, alcohol carboxylic acid, phenol and sulfonic acid with the proviso that mercaptan and hydroxamic acid may be included in the said active-hydrogen compound when boron trifluoride is employed, one equivalent of the said active-hydrogen compound being mixed with 1 to 5 moles of boron trifluoride and/or stannic compound, to form a boron trifluoride and/or stannic chloride complex therewith, the said catalyst being employed in an amount of from 0.05 to 5 mole percent of the chain-type ether compound based on boron trifluoride and/or stannic chloride, and the molar ratio of the alkylene oxide compound to the chain-type ether compound is from 0.5 to 5.

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**4,391,995**

## 4-PHENOXY-PHENOXY-ALKANE-CARBOXYLIC ACID DERIVATIVES AND PROCESS FOR THEIR MANUFACTURE

**Helmut Nahm, and Ernold Granzer, both of Kelkheim, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Division of Ser. No. 179,889, Aug. 20, 1980, Pat. No. 4,301,295, which is a continuation-in-part of Ser. No. 905,049, May 11, 1978, Pat. No. 4,238,626, which is a continuation-in-part of Ser. No. 542,061, Jan. 17, 1975, abandoned, which is a continuation of Ser. No. 273,770, Jul. 21, 1972, abandoned. This application May 21, 1981, Ser. No. 265,902**
**Claims priority, application Fed. Rep. of Germany, Jul. 23, 1971, 2136828**
**Int. Cl.³ C07C 2/88**
**U.S. Cl. 568—637** **1 Claim**

1. 4-(2,4-dichlorophenoxy)-phenol and the alkali metal phenolates thereof.

**4,391,996**

**1,1-DICHLORO-2,2-BIS(HYDROXYPHENYL)ETHYLENE**

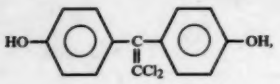
**Cleveland William K. S., Amsterdam; Jimmy L. Webb, Ballston Lake, and Charles M. Orlando, Glenville, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 117,727, Feb. 1, 1980, abandoned, which is a division of Ser. No. 919,461, Jun. 27, 1978, Pat. No. 4,221,901, which is a division of Ser. No. 765,654, Feb. 4, 1977, Pat. No. 4,117,018. This application Nov. 16, 1981, Ser. No. 321,644**

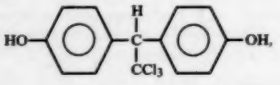
**Int. Cl.³ C07C *39/21***

**U.S. Cl. 568—726** **1 Claim**

1. A dichloride of the formula,



which has a trichloride impurity of the formula



which is present in said dichloride at a concentration of less than about 1000 ppm.

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**4,391,997**

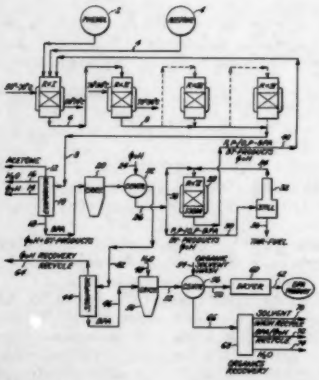
**ION EXCHANGE CATALYZED BISPHENOL PROCESS**

**Ashok K. Mendiratta, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Oct. 23, 1981, Ser. No. 314,164**

**Int. Cl.³ C07C *37/20, 39/16***

**U.S. Cl. 568—727** **9 Claims**



1. A process for the preparation of bisphenol-A comprising reacting phenol and acetone in the presence of a cation exchange resin catalyst in a continuous reactor system with reaction temperature increasing along the reactor or alternatively in a series of reactors operating at progressively increasing temperatures.

**4,391,998**

**PRODUCTION OF PARA-ISOPROPYLPHENOL**

**Margaret M. Wu, Belle Mead, N.J., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Oct. 21, 1981, Ser. No. 313,425**

**Int. Cl.³ C07C *37/14, 39/06***

**U.S. Cl. 568—781** **9 Claims**

1. A process for selectively alkylating phenol to provide a high yield of an isopropylphenol product enriched in the para-isopropyl isomer of isopropylphenol, said process comprising contacting phenol with a propylating agent selected from propylene and isopropanol in the presence of a zeolite catalyst selected from the group consisting of ZSM-5, ZSM-11, ZSM-23, ZSM-35, ZSM-38 and ZSM-48, under alkylation conditions which include a temperature within the range of from about 200° C. to 300° C.

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**4,391,999**

**3,4,5,6,6-PENTAMETHYL HEXANOL-2 AND ALKYL HOMOLOGUES THEREOF; PROCESS FOR PREPARING SAME AND ORGANOLEPTIC USES THEREOF**

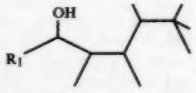
**Richard M. Boden, Ocean, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.**

**Continuation-in-part of Ser. No. 354,389, Mar. 2, 1982, which is a division of Ser. No. 252,334, Apr. 9, 1981, Pat. No. 4,336,164, which is a continuation-in-part of Ser. No. 212,887, Dec. 4, 1980, Pat. No. 4,318,934. This application Jul. 16, 1982, Ser. No. 399,066**

**Int. Cl.³ C07C *31/125;* A24B *3/12;* C11D *3/50***

**U.S. Cl. 568—840** **6 Claims**

1. At least one compound defined according to the structure:



wherein $R_1$ is $C_1$–$C_3$ alkyl.

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**4,392,000**

**STABILIZED COMPOSITIONS OF CHLORINATED SOLVENTS**

**Andre' Ryckaert, Brussels, and Michel Servais, Kraainem, both of Belgium, assignors to Solvay & Cie., Brussels, Belgium**

**Filed Oct. 19, 1981, Ser. No. 312,814**

**Claims priority, application France, Oct. 23, 1980, 80 22749**

**Int. Cl.³ C07C *17/42;* C11D *7/50;* C23G *5/02***

**U.S. Cl. 570—104** **17 Claims**

1. A stabilized composition containing a chlorinated solvent, which is stabilized by means of a heterocyclic compound containing an oxaziridine ring.

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**4,392,001**

**PROCESS FOR THE PREPARATION OF A CYCLOALKENE THROUGH PARTIAL HYDROGENATION OF THE CORRESPONDING AROMATIC HYDROCARBON**

**Johannes A. Don, Veenendaal, and Joseph J. F. Scholten, Sittard, both of Netherlands, assignors to Stamicarbon, B.V., Geleen, Netherlands**

**Filed Dec. 30, 1981, Ser. No. 335,817**

**Claims priority, application Netherlands, Dec. 31, 1980, 8007111; Sep. 2, 1981, 8104067**

**Int. Cl.³ C07C *5/10***

**U.S. Cl. 585—269** **11 Claims**

1. In processes for preparing a cycloalkene by partially hydrogenating the corresponding aromatic hydrocarbon in the presence of a catalyst, the improvement consisting essentially in the combination of partially hydrogenating an aromatic

hydrocarbon in the gas-phase in the presence of water vapor and in the presence of a ruthenium catalyst.

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**4,392,002**

## PROCESS FOR UPGRADING OLEFINIC $C_4$ CUTS

**Jean Cosyns, Maule; Bernard Juguin; Jean-Francois Le Page, both of Rueil Malmaison, and Jean Miquel, Paris, all of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France**

**Filed Oct. 16, 1981, Ser. No. 311,828**

**Claims priority, application France, Oct. 16, 1980, 80 22204**

**Int. Cl.³ C07C *2/08, 2/58***

**U.S. Cl. 585—329** **9 Claims**

1. A process for upgrading a dried $C_4$ olefinic cut, obtained from a cracking unit or a steam-cracking unit, substantially freed of butadiene, and dried, said process comprising the steps of:

(a) feeding the dried $C_4$ cut to a selective catalytic polymerization zone in the presence of a polymerization catalyst, said catalyst being a fluorinated alumina, a boron-alumina or a silica-alumina, and converting at least 95% of the isobutene of said olefinic cut, in major part to isobutene dimers and trimers, while limiting the overall conversions of the normal butenes of said starting olefinic cut to not over 3% by weight, the butane and isobutane of said olefinic cut being substantially unconverted;

(b) feeding the effluent from the polymerization zone to a hydroisomerization zone, in the presence of hydrogen and an isomerization catalyst comprising at least one Group VIII metal deposited on a carrier, and isomerizing the polymerization effluent under such conditions that at least 90% of the 1-butene of said polymerization effluent is isomerized to 2-butenes, the percentages of the other constituents of said effluent remaining substantially unchanged, the proportions of the normal butenes in the hydroisomerization effluent at the end of the isomerization reaction being at least 92% by weight of 2-butenes and less than 8% by weight of 1-butene;

(c) fractionating the effluent from the isomerization zone, and separately recovering a bottoms poly gasoline fraction comprising, in major part, isobutene dimers and trimers, and an overhead fraction comprising, in major part, isobutane, butane and butenes; and

(d) feeding the overhead fraction to an alkylation zone, fractionating the alkylation effluent, and separately recovering an overhead fraction of high saturated $C_4$ hydrocarbon content, and an alkylate.

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**4,392,003**

## ISOBUTENE BY DEHYDROISOMERIZATION OF NORMAL BUTANE

**Alexander J. Kolombos, Thames Ditton; Clive D. Telford, Ascot, and Dennis Young, Staines, all of England, assignors to The British Petroleum Company Limited, London, England**

**Filed Jun. 8, 1981, Ser. No. 271,429**

**Claims priority, application United Kingdom, Jun. 12, 1980, 8019241**

**Int. Cl.³ C07C *5/24, 5/32, 5/40***

**U.S. Cl. 585—661** **8 Claims**

1. A process for dehydroisomerisation of a hydrocarbon feedstock containing normal butane to isobutene which comprises bringing the feedstock at an elevated temperature into contact in a single stage with a catalyst composition comprising an element from Group IIIa of the Periodic Table or a compound thereof in combination with a support of $\alpha$-value below 45, said support being a zeolite selected from the group consisting of an aluminosilicate, a silicalite, a metal tectosilicate, and a boralite.

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**4,392,004**

## REDUCTION OF CYCLOPENTADIENE FROM ISOPRENE STREAMS

**Richard M. D'Sidocky, Ravenna, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Feb. 22, 1982, Ser. No. 350,913**

**Int. Cl.³ C07C *7/01, 7/12***

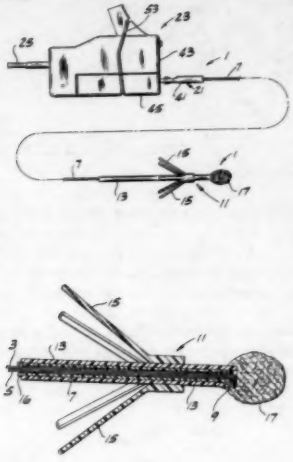
**U.S. Cl. 585—820** **4 Claims**

1. A process for the removal of small amounts of CPD from a C-5 hydrocarbon stream containing isoprene comprising contacting said stream with an LHSV value of from 0.5 to 30 and a temperature of from 0° C. to 100° C. with a base on an activated carbon carrier wherein said base is selected form the group consisting of KOH, NaOH and KF.

## 4,392,005
## TEMPERATURE SENSOR

Raymond F. Mohrman, St. Louis, Mo., assignor to Mon-a-therm, Inc., St. Louis, Mo.

Filed Nov. 2, 1981, Ser. No. 317,128
Int. Cl.³ H01L 35/06
U.S. Cl. 136—235 21 Claims



1. A temperature sensor comprising a pair of dissimilar metallic conductors electrically insulated one from the other along the lengths thereof but electrically connected at one of their ends to form a thermojunction, and a connector comprising an elongate backing strip of dielectric sheet material, the other ends of the conductors being positioned to extend generally transversely across one face of the strip and being spaced apart longitudinally of the strip, and facing strip means on the backing strip comprising a first facing strip of dielectric material on said one face of the backing strip overlying said other ends of the conductors, said first facing strip having openings therein exposing bare uninsulated portions of said other ends of the conductors to provide electrical contacts whereby on insertion of said connector into a mating connector said contacts are adapted to be engaged by corresponding contacts in the mating connector for making respective electrical connections.

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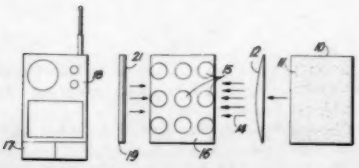
## 4,392,006
## SOLAR CELL ACTIVATION SYSTEM

Lawrence Apelian, 51 S. Coleman Rd., Centereach, N.Y. 11720

Filed Aug. 17, 1981, Ser. No. 293,280
Int. Cl.³ H01L 31/04
U.S. Cl. 136—246 8 Claims



1. A solar cell activation system comprising:

a substantially flat board-like transparent member having a coating of a light emitting substance on one surface thereof to emit light rays therefrom,

a thin magnifying lens mounted adjacent the coated member to focus the light rays emitted from the coated member,

a substantially flat member having a plurality of solar cells mounted and interconnected thereon and positioned at a predetermined distance from the lens to receive the focused light rays therefrom for purposes of activation, and,

a one-sided mirror mounted adjacent the solar cells and on the side opposite the lens to reflect the focussed light passing through said cells back onto said cells and means coupled to the solar cells to receive the output therefrom.

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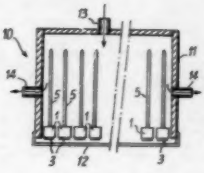
## 4,392,007
## SOLAR GENERATOR PROVIDING ELECTRICITY AND HEAT

Gerard Barkats, Mandelieu; Alain Girard, Cros de Cagnes; Jean Marchal, Peymeinade, and Charles Morel, Le Cannet, all of France, assignors to Societe Nationale Industrielle Aerospatiale, Paris, France

Filed Sep. 23, 1981, Ser. No. 304,853
Claims priority, application France, Oct. 9, 1980, 80 21595
Int. Cl.³ H01L 31/04; F24J 3/02
U.S. Cl. 136—248 7 Claims



1. A solar energy collecting device comprising:

a plurality of photovoltaic cells;

a plurality of heat pipes;

said photovoltaic cells being carried by said heat pipes in heat transfer relationship therewith; and

a fluid-tight cooling chamber provided with a cold fluid inlet and hot fluid outlet and enclosing at least said plurality of heat pipes.

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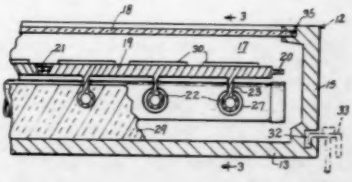
## 4,392,008
## COMBINED ELECTRICAL AND THERMAL SOLAR COLLECTOR

Herbert M. Cullis, Silver Spring, and Reinhard Stamminger, Gaithersburg, both of Md., assignors to Monegon, Ltd., Gaithersburg, Md.

Filed Nov. 13, 1981, Ser. No. 320,946
Int. Cl.³ H01L 31/04; F24J 3/02
U.S. Cl. 136—248 9 Claims



1. A solar panel assembly comprising support means defining an enclosure, flat solar collector plate means mounted in said enclosure, photovoltaic cell means including at least one thin semi-conductor wafer mounted on said plate means, flow tube means in the enclosure below said plate means, thin perpendicularly depending heat-conductive web means rigidly connecting said plate means to said flow tube means and being located

immediately subjacent said photovoltaic cell means, respective fluid inlet and outlet header means secured in said enclosure, and means communicatively connecting said inlet and outlet header means to opposite ends of said flow tube means, wherein said flow tube means comprises a plurality of parallel flow tubes below said plate means, wherein said web means comprises respective depending thin heat-conducting perpendicularly depending webs connecting said plate means to said flow tubes, and wherein said photovoltaic cell means includes a plurality of photovoltaic silicon semi-conductor wafers mounted on the plate means immediately adjacent to and substantially centered above the locations of said heat-conducting webs.

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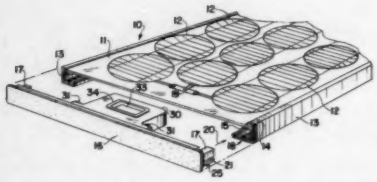
**4,392,009**

## SOLAR POWER MODULE

**Joseph D. Napoli, Windham, N.H., assignor to Exxon Research and Engineering Co., Florham Park, N.J.**

**Filed Oct. 16, 1981, Ser. No. 312,032**
**Int. Cl.³ H01L *31/04***
**U.S. Cl. 136—251** **16 Claims**



1. A mass-produced solar power module, comprising:
an array of current-generating solar cells arranged upon a substantially flat panel; and
a substantially rigid, easily assembled frame supporting said solar panel, said frame having spaced-apart side channels that each interlock with adjacent end sections about said panel to form a rigid, integral, easily-assembled, supporting frame for said panel.

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**4,392,010**

## PHOTOVOLTAIC CELLS HAVING CONTACTS AND METHOD OF APPLYING SAME

**Joseph Lindmayer, Bethesda, Md., assignor to Solarex Corporation, Rockville, Md.**

**Continuation-in-part of Ser. No. 3,945, Jan. 16, 1979, Pat. No. 4,297,391. This application Jul. 8, 1981, Ser. No. 281,380**
**Int. Cl.³ H01L *31/04, 31/18***
**U.S. Cl. 136—256** **15 Claims**

1. A method of applying an electrically conductive contact to the surface of a photovoltaic cell, comprising forming a mixture of aluminum and a solderable soft metal at a temperature in excess of the alloying temperature of said mixture and silicon, said metal comprising at least about 10% of said mixture, and spraying said mixture toward said surface at a distance such that said mixture will contact said surface at a temperature at which it will alloy with said silicon and thereby adhere to said surface.

12. A photovoltaic cell having a front surface adapted to receive and absorb light impinging thereon and a back surface opposed to said front surface, and an electrical contact covering at least a portion of at least one of said surfaces, said contact being comprised of a layer of a mixture of aluminum and at least about 10% zinc.

**4,392,011**

## SOLAR CELL STRUCTURE INCORPORATING A NOVEL SINGLE CRYSTAL SILICON MATERIAL

**Jacques I. Pankove, Princeton, and Chung P. Wu, Trenton, both of N.J., assignors to RCA Corporation, New York, N.Y.**

**Division of Ser. No. 145,239, Apr. 30, 1980, Pat. No. 4,322,253. This application Oct. 8, 1981, Ser. No. 309,695**
**Int. Cl.³ H01L *31/06***
**U.S. Cl. 136—261** **5 Claims**

4. A single crystal silicon solar cell comprising:
a body of single crystal silicon having regions of differing conductivity forming a photovoltaic junction therein, said body having opposed major surfaces wherein the major surface which is adapted to be incident to solar radiation has a region thereunder with sufficient concentration of hydrogen incorporated therein to have a band gap energy which is greater than the band gap energy of the single crystal silicon of said body; and
means for electrically contacting said opposed major surfaces.

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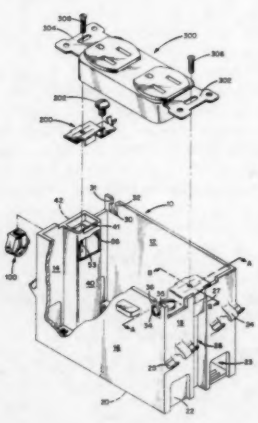
**4,392,012**

## ELECTRICAL WIRING BOX ARRANGEMENT WITH ALIGNABLE GROUNDING STRAP

**William Nattel, Montreal, Canada, assignor to GTE Sylvania Canada Limited, Montreal, Canada**

**Filed Oct. 13, 1981, Ser. No. 310,712**
**Int. Cl.³ H02G *3/08***
**U.S. Cl. 174—51** **7 Claims**



1. An electrical wiring box arrangement including in combination, an electrical wiring box and a grounding member;
said wiring box including:
a wall structure comprising front-to-rear walls and a rear wall therebetween which together define a chamber within the box with a forward facing opening for receiving an electrical wiring device,
said wall structure including support means for seatably receiving said grounding member and the mounting yoke of a wiring device mounted in said box chamber,

said support means including screw retaining means for retaining the mounting screw of said wiring device,

said wall structure further including first and second retaining means for retaining said grounding member against outward removal from said box in a direction toward said forward facing opening while permitting lateral slideable movement of said grounding member;

said grounding member including:

screw receiving means for receiving said wiring device mounting screw and providing electrical contact between said mounting screw and said grounding member,

means for attaching the ground conductor wire of an electrical cable,

electrically conductive pathway means between said screw receiving means and said ground conductor wire attachment means, and

first and second attachment means for coacting with said box wall first and second retaining means to attach said grounding member to said box wall structure;

whereby said grounding member is received and seated on said box wall support means and retained by said grounding member attachment means coacting with said box wall retaining means to attach said grounding member to said box wall structure while permitting lateral sliding movement of said grounding member to permit direct alignment of said screw receiving means of said grounding member and said screw retaining means of said box wall support member, the mounting screw of a wiring device mounted in said box chamber passing through said grounding member screw receiving means making firm electrical contact with said grounding member, and being received and retained by said screw retaining means of said box wall support means.

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**4,392,013**

## FINE-PATTERNED THICK FILM CONDUCTOR STRUCTURE AND MANUFACTURING METHOD THEREOF

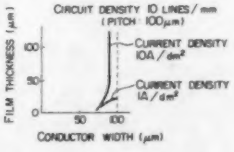
**Kaoru Ohmura; Takeo Kimura, and Tetsuhiro Kusunose, all of Fuji, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Dec. 22, 1980, Ser. No. 219,155**

**Claims priority, application Japan, Dec. 27, 1979, 54-169266; Dec. 27, 1979, 54-169267; Dec. 27, 1979, 54-169268; Jan. 25, 1980, 55-6956; Jan. 25, 1980, 55-6958; Aug. 20, 1980, 55-113410; Aug. 21, 1980, 55-113979**

**Int. Cl.³ H05K *1/02***

**U.S. Cl. 174—68.5** **11 Claims**




1. A fine-patterned thick film conductor structure having conductors formed on an insulating substrate, said conductors having a film thickness of 35–200 μm and a circuit density of no less than 5 lines/mm.

**4,392,014**

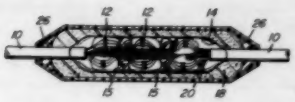
## TELEPHONE CABLE SPLICES

**William P. Trumble, Kanata; Roger C. Finn, and Charles F. C. Jackson, both of Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada**

**Filed Apr. 20, 1981, Ser. No. 255,781**

**Int. Cl.³ H02G *15/113***

**U.S. Cl. 174—92** **7 Claims**




5. A telecommunications cable splice closure comprising at least two sheathed cables spliced together by a plurality of connectors connecting the cables at unsheathed portions thereof, the connectors being encapsulated in a moisture impervious material, the encapsulated connectors being surrounded by a wrapping film, the wrapped connectors being closely embraced by a block of closed cell foam plastics, the foam plastics block being contained within a substantially cylindrical mold having truncated conical ends surrounding sheathed portions of the respective cables, the sheathed portions wrapped with an open cell material having a matrix of threads, said block of foam having a boundary region thereof within the wrapped open cell material, the boundary region being relatively more dense than an interior portion of the foam block.

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**4,392,015**

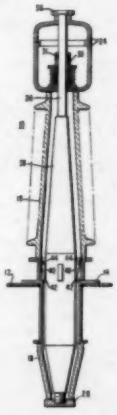
## CONDENSER-TYPE ELECTRICAL BUSHING WITH CENTRAL ELECTRODE ALIGNING WEDGING BLOCKS

**Robert W. Runnels, Milwaukee, Wis.; Loren B. Wagenaar, Muncie, Ind.; Louis E. Luke, Mt. Pleasant Township, Delaware County, Ind., and Thomas P. Bresnahan, Muncie, Ind., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Dec. 4, 1981, Ser. No. 327,648**

**Int. Cl.³ H01B *17/28***

**U.S. Cl. 174—143** **3 Claims**



1. A condenser bushing for electrical apparatus, comprising:

a cylindrical mounting flange having a predetermined inside diameter;

an upper casing connected to the mounting flange;

a lower casing coaxially positioned with said upper casing,

a central electrode positioned within said upper and said

lower casings, said electrode being supported by said upper casing, said electrode supporting said lower casing;

a condenser section wound about said central electrode, said condenser section having an outside diameter that is smaller than the inside diameter of said mounting flange; and

means for centering said condenser section within said mounting flange, said means including a plurality of triangular wedging blocks, said means being rigidly attached to said condenser section such that the combination of said outside diameter of said condenser section and said means for centering is larger than said inside diameter of said mounting flange thus preventing said condenser section and said central electrode from falling into the electrical apparatus upon mechanical failure of said said upper casing.

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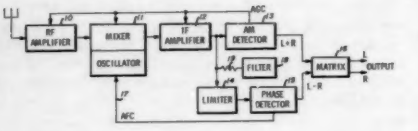
## 4,392,016
## AM STEREO CARRIER REINSERTION

**Don R. Sauer, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Mar. 2, 1981, Ser. No. 239,914**
**Int. Cl.³ H04H *5/00***
**U.S. Cl. 179—1 GS** **5 Claims**




1. In an AM stereo radio receiver that employs amplitude modulation of a carrier signal to transmit the stereo sum signal and phase modulation of said carrier to transmit the stereo difference signal and includes a phase demodulator for recovering said stereo difference signal, the improvement comprising:

filter means tuned to said carrier frequency; and

means for coupling said filter means to said receiver whereby said filter normally receives said carrier signal and will act to supply said carrier signal to said receiver during those brief periods of time when said carrier signal would be lost due to amplitude overmodulation.

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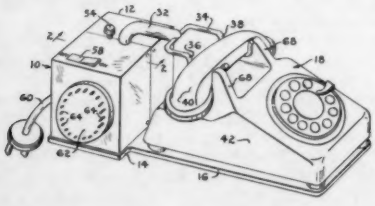
## 4,392,017
## TELEPHONE HANDSET LIFTING DEVICE

**Luis R. Torres, 3505 Fir St., East Chicago, Ind. 46312**

**Filed Mar. 6, 1981, Ser. No. 241,122**
**Int. Cl.³ H04M *15/00***
**U.S. Cl. 179—1 HS** **13 Claims**



1. A telephone handset lifting device comprising:

an electromagnetic coil;

shaft means formed to extend vertically through said electromagnetic coil, and horizontally across said coil;

said shaft means being vertically moveable by said electromagnetic coil;

structure for supporting said coil and said shaft means;

the end of said horizontally extending shaft means being formed to support a telephone handset for raising and lowering said telephone handset;

an electric current circuit connected to said coil for energizing said coil;

switch means in said electric current circuit operable to open and close said circuit;

a time sequence means for operating said switch means; and

a plurality of manually operable elements on said time sequence means arranged thereon to preselect a plurality of irregular time sequences for operating said switch means repeatedly during a time cycle.

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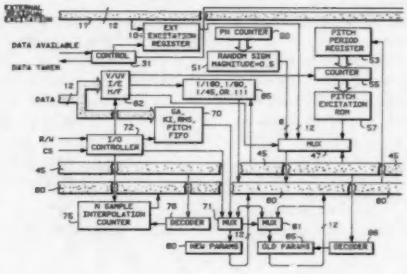
## 4,392,018
## SPEECH SYNTHESIZER WITH SMOOTH LINEAR INTERPOLATION

**Bruce Fette, Mesa, Ariz., assignor to Motorola Inc., Schaumburg, Ill.**

**Filed May 26, 1981, Ser. No. 267,203**
**Int. Cl.³ G10L *1/00***
**U.S. Cl. 179—1 SM** **9 Claims**




1. In a speech synthesizer including an all-pole, multi-stage lattice filter for reconstructing a plurality N of speech samples from each set of correlation coefficients and accompanying excitation signal applied thereto, smooth interpolation apparatus comprising:

(a) new parameter storage means for receiving and storing each new set of correlation coefficients;

(b) old parameter storage means connected to said new parameter storage means for receiving each of the sets of correlation coefficients subsequent to the reconstruction of the N speech samples therefrom; and

(c) circuit means connected to said new and old parameter storage means for determining the difference between each new and old correlation coefficient in the new and old sets, separating the difference into N steps and providing a correlation coefficient which changes in the N steps from the old correlation coefficient to the new correlation coefficient.

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## 4,392,019
## SURROUND SOUND SYSTEM

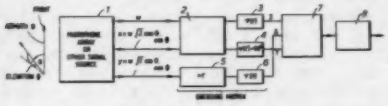
**Jonathan Halliday, Winchester, England, assignor to Independent Broadcasting Authority, London, England**

**Filed Dec. 19, 1980, Ser. No. 218,081**
**Int. Cl.³ H04S *3/00***
**U.S. Cl. 179—1 GQ** **10 Claims**

1. In a system for transmission and reception of horizontal surround-sound by modulation of a carrier, wherein the modulating signal contains a monophonic audio signal Σ, a subcarrier modulated by an audio signal equivalent to the stereo difference signal Δ of a stereophonic broadcast, a pilot tone at half the subcarrier frequency, and a second subcarrier in quadrature with the first and modulated by a third audio signal T,

the signals Σ, Δ and T being defined in terms of the direction of a sound to be reproduced, the improvement which comprises

(a) means for generating the signal Σ;



(b) means for generating the signal Δ at a phase angle with respect to the signal Σ which is selected from an in phase relationship and a 180° out of phase relationship for all angular values of elevation and azimuth; and

(c) means for generating the signal T with a phase shift of 90° with respect to the signals Σ and Δ.

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**4,392,020**

## STEREO DEMODULATION SYSTEM FOR AN FM STEREO BROADCAST RECEIVER

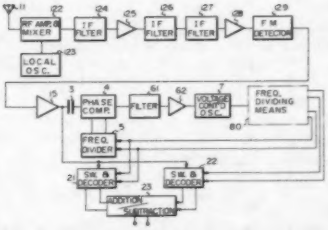
**Yoshimi Iso; Shigeki Inoue, and Toshifumi Shibuya, all of Toyokawa, Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 20, 1981, Ser. No. 236,536**

**Claims priority, application Japan, Feb. 27, 1980, 55-22793; Oct. 9, 1980, 55-140507**

**Int. Cl.³ H04H *5/00***

**U.S. Cl. 179—1 GE** **15 Claims**




1. A stereo demodulation system for an FM stereo broadcast receiver in which a signal for switching and decoding a received stereo composite signal is produced in a demodulator, said system comprising:

a voltage controlled oscillator which produces a signal of a specific frequency ($f_{VCO}$),

frequency dividing means for receiving the output signal of said voltage controlled oscillator and producing a first switching signal of 1/m frequency ($f_{VCO}/m$) of said specific frequency and a second switching signal of 1/l frequency ($f_{VCO}/l$) of said specific frequency,

a phase comparator for phase comparing a further frequency divided signal of said first switching signal with a pilot signal contained in the received stereo composite signal,

a low pass filter for filtering the output signal of said phase comparator and feeding back the thus filtered signal to said voltage controlled oscillator so that said voltage controlled oscillator, said frequency dividing means, said phase comparator and said low pass filter constituting a phase locked loop,

a first switch and decoder circuit for switching and decoding said stereo composite signal by said 1/m frequency ($f_{VCO}/m$) signal produced from said frequency dividing means,

a second switch and decoder circuit for switching and decoding said stereo composite signal by an output signal of 1/l frequency ($f_{VCO}/l$) of said predetermined frequency produced from said frequency dividing means, and

an addition/subtraction circuit for adding or subtracting the output signals of said first and second switch and decoder circuit so that the signal component in the output signal of said first switch and decoder circuit, which component is a product of the harmonic frequency component of the subcarrier signal and the stereo composite signal, is cancelled by the signal component in the output signal of said second switch and decoder circuit, which component is a product of the fundamental frequency component of the switching signal and the stereo composite signal,

characterized in that:

said first switching signal of 1/m frequency ($f_{VCO}/m$) and said second switching signal of 1/l frequency ($f_{VCO}/l$) are produced by said frequency dividing means with the fixed phase relationship between said first and second switching signals.

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**4,392,021**

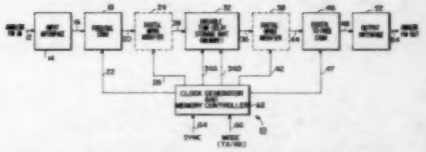
## SECURE FACSIMILE TRANSMISSION SYSTEM USING TIME-DELAY MODULATION

**Matthew W. Slate, Sudbury, Mass., assignor to Technical Communications Corporation, Concord, Mass.**

**Filed Jul. 28, 1980, Ser. No. 172,819**

**Int. Cl.³ H04K *1/06***

**U.S. Cl. 179—1.5 R** **20 Claims**



1. A system for providing secure transmission of an analog sourcesignal over an unsecured channel, between a transmitting site and a receiving site, comprising:

at the transmitting site:

means for converting the analog source signal into a sequence of digital words each of which represents the instantaneous value of that signal at a particular sampling time;

means for storing a finite multiplicity of the digital words;

means for providing a first clocking signal at a first rate;

means for writing the digital words into the storing means responsive to the first clocking signal;

means for providing a second clocking signal at a second rate;

means for reading said digital words out of said storing means responsive to the second clocking signal;

the long-term time average of the periods of the first and second clocking signals being equal;

at least one of the first and second rates being pseudo-randomly variable, whereby the time between writing a digital word into the storage means and reading such digital word from the storage means is pseudo-randomly variable;

means for converting the digital words read from the storage means to a frequency-modulated analog signal for transmission over the unsecured channel; and

at the receiving site:

means for converting the analog signal received over the unsecured channel into a second sequence of digital words, each of which represents the instantaneous value of such analog signal at a particular sampling time;

such means for converting the analog signal into digital words including means for sampling such analog signal responsive to the third clocking signal;

means for providing a third clocking signal at a third rate;

means for storing a finite multiplicity of the digital words of the second sequence;

means for writing the digital words into such storing means responsive to the third clocking signal;

means for providing a fourth clocking signal at a fourth rate;

means for reading said digital words out of said storing means responsive to the fourth clocking signal;

said third and fourth rates being selected such that the time average of the period of each is the same as the time average of the periods of the first and second clocking signals;

the further clocking signal further being selected such that the time between writing a digital word into the storing means at the transmitting site and reading such digital word from the storing means at the receiving site is constant; and

means for converting the digital words read from the storing means at the receiving site to an analog signal for use at the receiving site.

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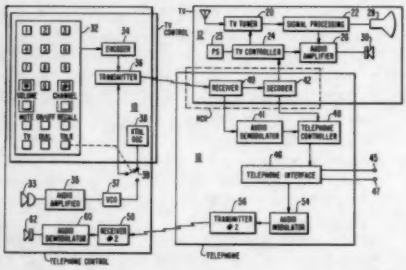
**4,392,022**

## TELEVISION REMOTE CONTROL SYSTEM FOR SELECTIVELY CONTROLLING A PLURALITY OF EXTERNAL APPARATUS

**David J. Carlson, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.**

**Filed Jan. 30, 1981, Ser. No. 230,359**
**Int. Cl.³ H04M *11/08***
**U.S. Cl. 179—2 TV** **3 Claims**



1. A television remote control system including a television receiver and a remote control unit comprising:

keyboard means included in said remote control unit for entering data of a first type to control various functions of said television receiver and of a second type corresponding to digits of a telephone number;

encoder means included in said remote control unit for generating a digitally encoded data signal in accordance with said entered data of said first and second types;

a microphone included in said remote control unit for providing an analog audio signal;

first modulator means included in said remote control unit for continuously modulating a carrier signal in accordance with said analog audio signal;

first infrared transmitter means included in said remote control means for transmitting a selected one of said digitally encoded data signal and said continuously modulated carrier signal;

switching means included in said remote control means for selecting said one of said digitally encoded data signal and said continuously modulated carrier signal;

first infrared receiver means included in said television receiver for receiving said selected signal transmitted by said first infrared transmitter means;

decoder means included in said television receiver for decoding said received selected signal corresponding to said digitally encoded data signal to produce first decoded digital signals according to said entered data of said first type and to produce second decoded digital signals according to said entered data of said second type;

television control means included in said television receiver for controlling said various functions of said television receiver in accordance with said entered data of said first type in response to said first decoded digital signals;

telephone control means included in said television receiver for generating telephone dialing signals in accordance with said entered data of said second type in response to said second decoded digital signals;

first demodulator means included in said television receiver and responsive to said received selected signal corresponding to said continuously modulated carrier signal for demodulating said analog audio signals;

telephone interface means included in said television receiver and to which a telephone line is coupled, for applying said telephone dialing signals to said telephone line to dial said telephone number and for applying said demodulated analog audio signals to said telephone line when said telephone number has been dialed;

second modulator means included in said television receiver and coupled to said telephone line by said telephone interface means, for modulating a second carrier signal in accordance with incoming audio signals from said telephone line;

second infrared transmitter means included in said television receiver for transmitting said modulated second carrier signal;

second infrared receiver means included in said remote control unit for receiving said modulated second carrier signal transmitted by said second infrared transmitter means;

second demodulator means included in said remote control unit and responsive to said received modulated second carrier signal for demodulating said incoming audio signals; and

sound reproducing means included in said remote control unit for reproducing sounds in accordance with said demodulated incoming audio signals.

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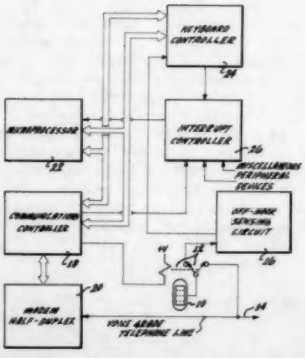
**4,392,023**

## OFF-HOOK TELEPHONE SENSING SYSTEM

**Michael L. Sears, Redondo Beach, Calif., assignor to Transaction Technology, Inc., Santa Monica, Calif.**

**Filed Nov. 17, 1980, Ser. No. 207,660**
**Int. Cl.³ H04M *11/00***
**U.S. Cl. 179—2 DP** **6 Claims**



1. An off-hook telephone sensing system for use with a voice and data transmission system wherein the system includes a transaction terminal coupled to a telephone line for data trans-

mission and a standard telephone instrument coupled to the telephone line for voice transmission, including

an off-hook telephone sensing device coupled to the standard telephone instrument for detecting the on-hook or off-hook condition of the instrument and for providing an output signal having values in accordance with the on-hook or off-hook condition of the instrument, and wherein the off-hook sensing device includes a voltage comparator having a reference voltage input and a variable voltage input and with a change in impedance of the standard telephone instrument between the on-hook and off-hook conditions controlling the value of the variable voltage input and with the voltage comparator providing the output signal in accordance with the change in impedance of the telephone instrument, and wherein the impedance of the telephone instrument forms part of a voltage divider circuit and with the change in impedance of the telephone instrument providing the variable voltage input to the voltage comparator,

a switching means having first and second states coupled to the telephone instrument and to the telephone line and with the telephone instrument connected to the telephone line with the switching means in the first state and with the telephone instrument disconnected from the telephone line with the switching means in the second state,

means coupled to the off-hook sensing device and responsive to the output signal for producing an interrupt signal when the off-hook sensing device detects the off-hook condition of the telephone instrument and with the switching means in the second state, and

means coupled to the switching means and responsive to the interrupt signal for controlling the switching means from the second state to the first state after the reception of the interrupt signal.

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**4,392,024**

## ELECTRONIC KEY TELEPHONE SET CIRCUIT FOR PERMITTING DIALING DURING FAILURE OF COMMERCIAL POWER SUPPLIED TO THE SET

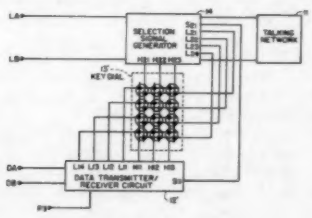
**Tsuyoshi Shinoi, Yokohama; Keisuke Mochizuki; Yoshimi Suzuki, both of Kawasaki; Masaru Kudoh, Tokyo, and Wataru Hashimoto, Hyogo, all of Japan, assignors to Nitsuko Limited, Kawasaki and Nippon Telegraph & Telephone Public Corporation, Tokyo, both of, Japan**

**Filed Dec. 8, 1981, Ser. No. 328,451**

**Claims priority, application Japan, Dec. 25, 1980, 55/182790**

**Int. Cl.³ H04M** *1/23, 1/72*

**U.S. Cl. 179—99 R** **5 Claims**




2. An electronic key telephone set in an electronic key telephone system having a key service unit, which comprises:

two contacts provided for each key in a key dial;

data signal transmitter/receiver circuit means connected with one of said two contacts of each key;

selection signal generator circuit means connected to the other of said two contacts of each key to generate a selection signal corresponding to the key;

means for detecting commercial power failure; and

means for connecting said selection signal generator circuit means to a voice signal pair line during the commercial power failure.

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**4,392,025**

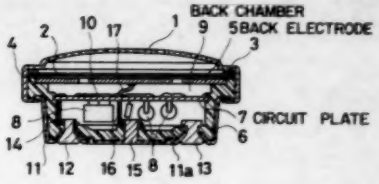
## CONDENSER MICROPHONE

**Junichi Tamamura, Yao; Mamoru Yasuda; Motomi Hosoda, both of Kashiwara, and Shinichi Saeki, Yao, all of Japan, assignors to Hosiden Electronics Co., Ltd., Osaka, Japan**

**Filed May 27, 1981, Ser. No. 267,461**

**Int. Cl.³ H04R** *19/04, 1/22*

**U.S. Cl. 179—111 R** **1 Claim**




1. A condenser microphone, comprising:

a diaphragm to be vibrated in response to an input sound;

a back electrode, having at least one opening therethrough, disposed oppositely to said diaphragm;

a circuit assembling plate having one surface only to which a plurality of electronic circuit elements are attached; and,

a holder for holding said back electrode and said circuit assembling plate in an orientation where that surface of said back electrode which is not faced toward said diaphragm, is faced toward that surface of said circuit assembling plate to which said electronic circuit elements are not attached, with a predetermined distance provided between said back electrode and said circuit assembling plate, said holder defining a back chamber in a space between said back electrode and said circuit assembling plate, said back chamber being closed except for said at least one opening in said back electrode.

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**4,392,026**

## SUBSCRIBER LINE TESTING SYSTEM

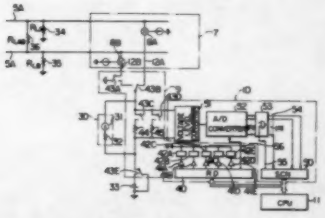
**Takafumi Kojima; Kenzo Tanaki, both of Yokohama, and Shiro Yokota, Tokyo, all of Japan, assignors to Hitachi, Ltd. and Nippon Telegraph & Telephone Public Corporation, both of Tokyo, Japan**

**Filed Oct. 7, 1981, Ser. No. 309,400**

**Claims priority, application Japan, Oct. 8, 1980, 55-139868**

**Int. Cl.³ H04B** *3/46;* **H04M** *3/30*

**U.S. Cl. 179—175.3 R** **13 Claims**




3. A subscriber line testing system, comprising:

a plurality of subscriber lines;

semiconductor switches each driven by a constant gate current and selected for leading a desired one of said subscriber lines for testing;

change-over means for changing over a value of current

flowing through the subscriber line to be tested and introduced through the selected one of said semiconductor switches;

means for measuring the levels of the current fed through the selected one of said semiconductor switches and changed over by said change-over means, respectively.

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**4,392,027**

**METHOD AND APPARATUS FOR PROVIDING A UNIFORM SOUND DISTRIBUTION IN AN AIRCRAFT CABIN**

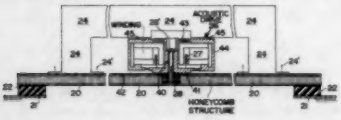
**Thomas-Mathias Bock, Buxtehude, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 35,014, May 1, 1979. This application Jun. 26, 1981, Ser. No. 277,650**

**Claims priority, application Fed. Rep. of Germany, May 5, 1978, 2819615**

**Int. Cl.³ H04R 9/04**

**U.S. Cl. 179—181 W** **7 Claims**



1. A method for the uniform distribution of sound in an aircraft or spacecraft cabin structure, comprising the following step: substantially enclosing the cabin space by a plurality of flexible structural inner wall and ceiling panel members inside an outer cabin wall, elastically connecting at least certain ones of said panel members substantially at the edges thereof to said cabin structure to provide a movable support enabling the respective panel member to vibrate, centrally connecting an acoustic drive member of acoustic drive means including said drive member and a mass, said drive member being movable relative to said mass, to said certain panel members in such a manner that the drive member is connected to the respective panel member intermediate of the panel edges on a surface area contact, and that the mass of the drive means is rigidly secured to the same panel member substantially adjacent the edges of the same panel member, whereby the acoustic drive means are located between the outer cabin wall and the respective panel member which may vibrate as an acoustical diaphragm and whereby the cabin structure with its inner and outer wall forms a loudspeaker cabinet in which said drive means are located.

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**4,392,028**

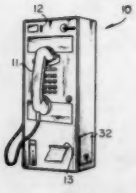
**PAY TELEPHONE WITH SANITIZED TISSUE DISPENSER**

**Richard L. Saxton, 4136 Brown Rd., Indianapolis, Ind. 46226**

**Filed Feb. 6, 1981, Ser. No. 232,164**

**Int. Cl.³ H04R 1/12**

**U.S. Cl. 179—185** **13 Claims**



1. The combination of:

pay telephone means including a telephone with coin-receiving means operable to issue a signal upon receipt of a coin, said pay telephone means further including a tissue-dispensing opening;

a supply of sanitized tissue;

storage means within said pay telephone means to receive and hold said supply of sanitized tissue; and

dispensing means within said pay telephone means operably associated with said coin-receiving means and said supply of sanitized tissue and operable to force a tissue from said supply into said opening upon receipt of said signal, and wherein:

said dispensing means includes an electrically operated rotatable spindle; and

said supply of sanitized tissue includes a roll of sanitized tissue removably mounted to said spindle.

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**4,392,029**

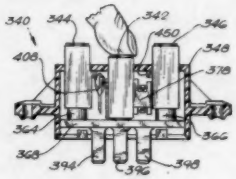
**PUSH BUTTON SWITCH HAVING LATCHING SPRING ARM MOLDED ON PLASTIC CASING**

**William J. Schaad, Winnetka; Charles E. Black, III, Mount Prospect, and Raymond T. Halstead, Wheeling, all of Ill., assignors to Indak Manufacturing Corp., Northbrook, Ill.**

**Filed Jul. 28, 1981, Ser. No. 287,690**

**Int. Cl.³ H01H 9/20**

**U.S. Cl. 200—5 B** **8 Claims**



1. A push button switch, comprising

first and second parallel push buttons,

a casing having first and second guide means for guiding said first and second push buttons along parallel closely spaced paths,

said push buttons being movable between extended and depressed positions,

resilient means biasing each of said push buttons toward said extended position,

switching means in said casing and operable by movement of said first push button,

said casing being molded from a resinous plastic material,

a flexible resilient latching spring arm molded in one piece with said casing and extending between said first and second push buttons,

cooperative latching elements on said first push button and said latching spring arm for causing deflection of said latching spring arm followed by latching of said first push button in its depressed position,

and cooperative unlatching elements on said second push button and said arm for deflecting said arm and thereby causing disengagement of said latching elements in response to depression of said second push button.

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**4,392,030**

**ADJUSTABLE ROTARY SWITCH**

**Gary L. Buss, Arden, N.C., assignor to CTS Corporation, Elkhart, Ind.**

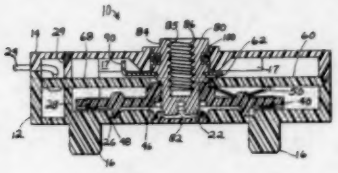
**Filed Aug. 19, 1981, Ser. No. 294,374**

**Int. Cl.³ H01H 21/76**

**U.S. Cl. 200—11 R** **7 Claims**

1. A rotary switch calibrated for accurately selecting any one of a plurality of combinations of external circuits connected to the switch, the combinations being made in accordance with a predetermined code, said rotary switch compris-

ing a housing having one end open and a housing wall with a centrally disposed aperture and a noncentrally located opening therein, an insulating substrate having a plurality of electrical contact paths for effecting said code and arranged in multiple concentric rings in the surface thereof, the surfaces of said contact paths being flush with the surface of said insulating substrate, a rotor comprising an insulating annular body and having teeth means for calibration of said switch and located at a portion of the circumference of said rotor, contactor means having multiple rake contactors and secured to said rotor for engaging selected combinations of contact paths in different ones of said rings whereby rake contactor surface areas engaging said paths remain constant despite wear, shaft means



mounted in said switch to preclude axial movement thereof and coupled to said rotor to support and position said rotor in relationship to said housing and insulating substrate having the contact paths therein, said shaft means having tool adjustment means at one end thereof, and a cover secured to said housing to enclose said open end and having a cover aperture therein, said shaft means journalled in said cover aperture, whereby said tool adjustment means is accessible through said centrally disposed aperture and said teeth means accessible through said noncentrally located opening for adjustable positioning of said rotor and contactor means relatively to said shaft means and contact paths prior to fixing said rotor to said shaft means to calibrate said switch and effect precise switching accuracy in the selection of a combination of said external circuits.

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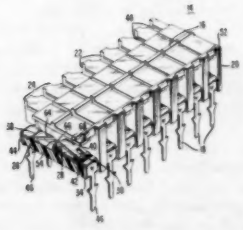
**4,392,031**

## MINIATURE ELECTRICAL SWITCH

**Hazen Curtis, III, Andover, Mass., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Filed Dec. 31, 1981, Ser. No. 336,325**
**Int. Cl.³ H01H *15/02***
**U.S. Cl. 200—16 R** **7 Claims**



1. An electrical slide switch of the type having a cover which leaves exposed one or more sliders for actuating make-or-break contact members inside the switch, CHARACTERIZED IN THAT

said switch comprises under said cover a unitary frame member having a base which forms a floor and having at least two partitions extending from said base to form between them at least one chamber for receiving said contact members, said partitions being adapted at their free edges remote from said floor to form a slot for holding and guiding said sliders, said contact members comprising a spring member which is pressed against an anvil member by action of a cam surface on said slider engaging a cam-follower surface of said spring member, and said contact members each including a clip portion by which they are resiliently held to the edge of said base.

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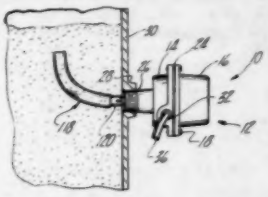
**4,392,032**

## ROTATING PADDLE BIN LEVEL INDICATOR

**Donald E. Roach, II, Marysville, Mich., assignor to Berwind Corporation, Philadelphia, Pa.**

**Filed Apr. 28, 1981, Ser. No. 258,058**
**Int. Cl.³ H01H *35/00*; G08B *21/00***
**U.S. Cl. 200—61.21** **8 Claims**



1. Apparatus for indicating the level of material in a storage bin comprising a hollow enclosure including means for mounting said enclosure to a storage bin, motor means mounted for limited movement within said enclosure, a paddle operatively coupled to said motor means and adapted to be disposed for rotation within said bin, rotation of said paddle being retarded when material stored in said bin is at a level so as to stallably engage said paddle, means mounted within said enclosure for detecting limited movement of said motor means when rotation of said paddle is retarded by material stored in said bin, and fail safe means operatively connected to said means for detecting limited movement for indicating a preselected material level condition at said means for detecting limited movement in the event of failure at said apparatus independently of actual material level relative to said paddle.

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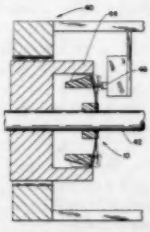
**4,392,033**

## CENTRIFUGAL SWITCHING SYSTEM

**Francis C. Peterson, St. Charles, Ill., assignor to Illinois Tool Works, Inc., Chicago, Ill.**

**Filed Apr. 6, 1981, Ser. No. 251,430**
**Int. Cl.³ H01H *35/10***
**U.S. Cl. 200—80 R** **13 Claims**



1. In an actuator responsive to centrifugal forces for actuating a switching system in a motor assembly, an actuator member fixedly mounted on an armature shaft within the motor assembly, said actuator member comprising a hub section of a predetermined thickness and axial extent, a generally dome-like, circumferentially disposed, and substantially continuous web section extending radially outwardly from and axially in

one direction relative to said hub section, said dome-like web section including a generally convex surface with a plurality of circumferentially spaced weight leg sections emanating from the outer periphery thereof, each of said weight leg sections extending axially relative to said axial extent of said hub in said one direction for a predetermined axial extent, and wherein the dome-like web includes a plurality of radially extending slots inwardly directed from the outer periphery of said actuator member, circumferentially extending means on said actuator member proximate said outer periphery for actuating a prepositioned switch mounted within said switching system, whereby as said armature shaft reaches a predetermined rotational speed said weight leg sections move radially outwardly causing said dome-like web to snap from a first position to a second position wherein said circumferentially extending means actuates said prepositioned switch when said dome-like web is in said second position.

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**4,392,034**

## ELECTRICAL SWITCH CONSTRUCTION

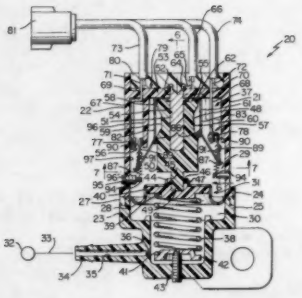
**Frank Payne, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.**

**Continuation-in-part of Ser. No. 187,498, Sep. 15, 1980, Pat. No. 4,357,589. This application Mar. 6, 1981, Ser. No. 241,004**

**The portion of the term of this patent subsequent to Nov. 2, 1999, has been disclaimed.**

**Int. Cl.³ H01H *35/34***

**U.S. Cl. 200—81.4** **12 Claims**



1. In an electrical switch construction having electrical contact means operated by an axially movable plunger means of a device carried by said construction, said contact means comprising a plurality of pairs of cooperating contacts arranged to have each cooperating pair thereof operated by said plunger means as said device axially moves said plunger means in one direction, each said pair of cooperating contacts comprising a fixed contact and a movable contact, each movable contact being snap-acting, each movable contact having a pivot member pivotally mounted to said construction, a one-piece substantially U-shaped flexible member having a cross member and a pair of legs extending from said cross member and defining pivot means that pivotally mount said pivot members to said construction, the improvement wherein said legs respectively have cam follower means intermediate said pivot means thereof and said cross member, said plunger means being axially movable between said legs and having cam means serially engageable with said follower means to serially flex said legs and thereby move said pivot means thereof to cause said pivot members to serially pivot as said plunger means is axially moved by said device in said one direction.

**4,392,035**

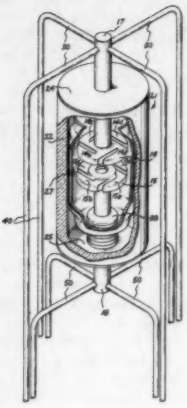
## VACUUM INTERRUPTER

**Gerhard Friind, Altamont; James J. Carroll, Clifton Park, and John H. Van Noy, Ballston Spa, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Jun. 3, 1981, Ser. No. 270,056**

**Int. Cl.³ H01H *33/66***

**U.S. Cl. 200—144 B** **22 Claims**



1. An improved vacuum interrupter, comprising:

(a) an evacuated vessel having a generally cylindrical conductive sidewall;

(b) first and second generally disc-shaped contacts disposed within said conductive vessel, and spaced inwardly from said conductive sidewall by at least a first predetermined distance, said contacts being substantially aligned with each other along a contact axis, and defining a mating interface when abutting each other;

(c) first conductor means projecting externally of said vessel and being connected to said first contact;

(d) second conductor means projecting externally of said vessel and being connected to said second contact;

(e) third conductor means connected to said first conductor means at a second predetermined distance from said mating interface on a first side of said mating interface, said distance being measured in a direction parallel to said contact axis; and

(f) fourth conductor means connected to said third conductor means, said fourth conductor means being disposed substantially concentrically and symmetrically about said contact axis, said fourth conductor means running from a third predetermined distance from said mating interface on said first side thereof to a fourth predetermined distance from said mating interface on a second side of said mating interface, and spaced between fifth and sixth predetermined distances from said contact axis said third and fourth distances being measured in a direction parallel to said contact axis and said fifth and sixth dimensions being measured in a direction perpendicular to said contact axis, said second and fourth conductor means being parallel to each other for a finite extent and said fourth conductor means being oriented so as to carry current in a direction substantially parallel to said contact axis.

4,392,036

## LOW-VOLTAGE PROTECTIVE CIRCUIT BREAKER WITH A FORKED LOCKING LEVER

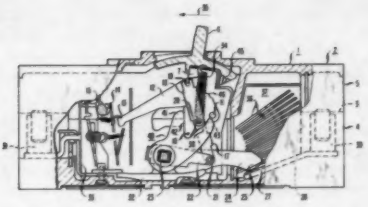
Werner Troebel, and Martin Böttcher, both of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Aug. 31, 1981, Ser. No. 297,769

Claims priority, application Fed. Rep. of Germany, Aug. 29, 1980, 3033213

Int. Cl.³ H01H 9/20

U.S. Cl. 200—322 6 Claims



1. A low-voltage circuit breaker comprising a drive lever, an operating handle to move the drive lever, a drive spring connected to the drive lever to be operated thereby, a toggle system including two toggle levers and a toggle joint connecting the levers together, a control shaft connected by the toggle lever system and the drive spring to the drive lever, a movable contact connected to the control shaft to be moved thereby, and a fixed contact in the path of movement of the movable contact to be engaged thereby, the invention comprising:

a locking lever pivotally mounted on the control shaft and movable between an "on" position and an "off" position; and

a working surface on the drive lever, the locking lever comprising a first portion to be engaged by the working surface, whereby the working surface moves the locking lever toward its "off" position when the handle moves towards its "off" position, the locking lever comprising a second portion to be moved toward engagement with the toggle joint when the locking lever is moved by the working surface, the second portion of the locking lever being spaced from the toggle joint pin when the working surface of the drive lever first moves the locking lever, whereby there is play between the second portion of the locking lever and the toggle joint pin such that the locking lever can only be pivoted part way and allows only partial movement of the drive lever and the handle attached thereto unless the toggle joint pin moves out of the way of the second portion of the locking lever.

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4,392,037

## STABILIZED BUTTON FOR AN ELECTRICAL KEYBOARD

Anthony Fleming, Glasgow, Scotland, assignor to Burroughs Corporation, Detroit, Mich.

Filed Jun. 4, 1981, Ser. No. 270,689

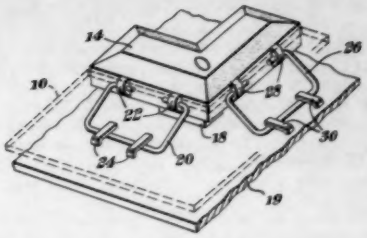
Claims priority, application United Kingdom, Jun. 7, 1980, 8018745

Int. Cl.³ H01H 13/00

U.S. Cl. 200—340 7 Claims

1. A keyboard with depressable keys mounted on a base, the keyboard having apparatus for stabilizing the movement of the keys along the axes orthogonal to the direction of depression of the keys comprising:

one or more rigid members, each said member movably secured at multiple points to said key and movably secured at multiple points to said base, said multiple securing points for said key and said base being along lines maintaining a parallel relation with one of said axis orthogonal



to the direction of key depression, said secured rigid members stabilizing movement of said keys along the axes.

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4,392,038

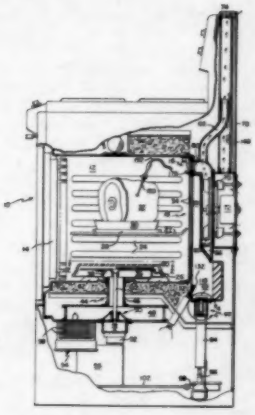
## SELF-CLEANING MICROWAVE CONVECTION OVEN

William J. Day, Allentown, and Bernard J. Weiss, Berto, both of Pa., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 4,008, Jan. 16, 1979, abandoned. This application Nov. 10, 1980, Ser. No. 208,229

Int. Cl.³ H05B 6/64

U.S. Cl. 219—10.55 D 2 Claims



1. A combination microwave and convection heating system comprising:

an enclosure supplied with microwave energy;

a vapor outlet region in the rear of said enclosure comprising a plurality of apertures whose maximum dimensions are substantially less than a half wavelength of said microwave energy;

a blower system positioned outside said enclosure and adjacent said vapor outlet region;

an elongated gas ribbon burner having a plurality of substantially parallel ribbons defining rows of ports, said burner being positioned outside said enclosure beneath said outlet region, said burner having a fuel-air mixture drawn therethrough by said blower system for providing a flow of combustion products past said outlet region to said blower system for circulating said combustion products through said enclosure; and

said burner comprising means for restricting the height of the combustion region above said burner to retard ionization of vapor in said vapor outlet region, said restricting

means comprising a longitudinal secondary air source dividing said burner into two substantially parallel sections.

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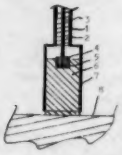
4,392,039

## DIELECTRIC HEATING APPLICATOR

Per O. Risman, Huskvarna, Sweden, assignor to P.O.R. Microtrans AB, Huskvarna, Sweden

Filed Jan. 19, 1981, Ser. No. 226,537
Claims priority, application Sweden, Jan. 21, 1980, 8000494
Int. Cl.³ H05B 6/70
U.S. Cl. 219—10.55 A 5 Claims



1. A dielectric heating applicator for heating an object, said applicator comprising:

a hollow cylindrical metal body;

a mass of low-loss dielectric material, having a dielectric constant $\epsilon'_{rd}$, disposed within and in direct contact with said body;

coupling means at one side of said body for feeding microwave energy coaxially to said body from a microwave generator; and

means, including the low-loss dielectric material, for forming a resonator at the frequency of the microwave energy fed to said body when an object located at another side of said body is in physical contact with the applicator;

wherein said dielectric constant $\epsilon'_{rd}$ of said dielectric material is greater than the dielectric constant $\epsilon'_{rl}$ of said object.

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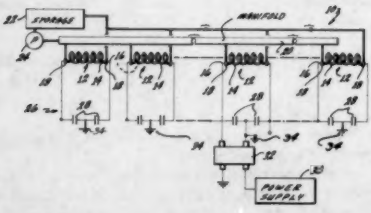
4,392,040

## INDUCTION HEATING APPARATUS FOR USE IN CAUSING NECROSIS OF NEOPLASM

Robert W. Rand, 521 N. Bristol Ave., Los Angeles, Calif. 90049; Harold D. Snow, 4201 Noble Ave., Sherman Oaks, Calif. 91403; David G. Elliott, 737 W. Startlight Hights, La Canada, Calif. 91011, and Glenn M. Haskins, 3811 Rio Hondo Ave., Rosemead, Calif. 91770

Filed Jan. 9, 1981, Ser. No. 223,727
Int. Cl.³ H05B 6/44
U.S. Cl. 219—10.71 7 Claims




1. An induction heating apparatus having an induction heating coil and a power supply means connected to said heating coil for supplying electric power to said coil in which the improvement comprises:

a plurality of different coils which are identical to said heating coil,

each of said coils being a flat "pancake" coil including a series of turns of an electrically non-conductive tube with a multi-strand conductor extending through its interior, this conductor being sufficiently small so as to permit a cooling fluid to be circulated through the interior of the tube within which it is located,

said coils being located closely adjacent to one another in a "stack" in which said coils are aligned with one another so as to be capable of serving as a series of closely coupled transformer coils,

manifold means connected to the ends of said tubes of said coils for conveying a cooling fluid through said tubes of said coils,

a capacitor means connected across the ends of the conductor in each of said coils and said heating coil so as to constitute, in combination with the coil to which it is attached, a tank circuit having a resonant frequency,

said capacitor means all having equal capacitance values,

said tank circuits all having the same resonant frequency,

said power supply means being connected only to said heating coil and the tank circuit associated with said heating coil and capable of supplying power at a frequency which is the same as the resonant frequency of the tank circuits,

said power supply means being adjustable so that the frequency of the power supplied to the tank circuit to which it is connected can be adjusted in accordance with any change in the resonant frequency of said tank circuits.

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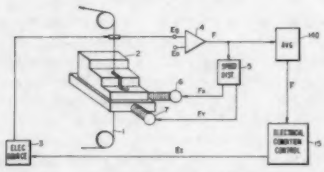
4,392,041

## ELECTRIC DISCHARGE MACHINING APPARATUS WITH A WIRE-SHAPED ELECTRODE

Takeshi Yatomi, and Yutaka Tanaka, both of Aichi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP80/00047, § 371 Date Nov. 22, 1980, § 102(e) Date Nov. 21, 1980, PCT Pub. No. WO80/02003, PCT Pub. Date Oct. 2, 1980
PCT Filed Mar. 21, 1980, Ser. No. 224,512
Claims priority, application Japan, Mar. 22, 1979, 54-33577; Mar. 22, 1979, 54-33578
Int. Cl.³ B23P 1/08
U.S. Cl. 219—69 W 27 Claims



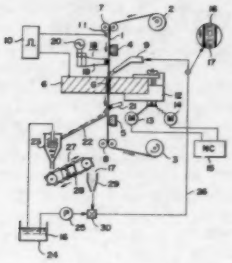
1. In an electric discharge machine (EDM) apparatus of the type wherein machining is caused by translating a wire electrode with respect to a workpiece at a machining feed speed and generating an electric discharge across a gap between said electrode and workpiece, said machining feed speed being controlled to maintain a substantially constant voltage across said gap, said EDM apparatus including means for generating a machining feed speed signal in accordance with said machining feed speed, a machining electric source for maintaining desired machining electrical conditions in accordance with control signals, and arithmetic means responsive to said machining feed speed signal for generating said control signals, the improvement characterized in that said arithmetic means comprises averaging means responsive to said machining feed speed signal for generating an averaged signal representing the average machining feed speed, said arithmetic means generating said control signals in accordance with said averaged signal, and said machining electric source changing its electrical conditions at predetermined intervals as said wire electrode continuously translates with respect to said workpiece.

4,392,042

## METHOD OF AND APPARATUS FOR ELECTROEROSIVELY WIRE-CUTTING A CONDUCTIVE WORKPIECE

Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japax Research Incorporated, Yokohama, Japan

Filed Feb. 24, 1981, Ser. No. 237,677
Claims priority, application Japan, Feb. 25, 1980, 55-23062; Feb. 25, 1980, 55-23063
Int. Cl.³ B23P 1/02
U.S. Cl. 219—69 W 4 Claims



1. In an apparatus for electroerosively wire-cutting an electrically conductive workpiece to form a desired contour therein, including supply means for continuously supplying a water machining medium into a machining gap defined between the workpiece and a wire electrode supported under tension across supply and takeup sides and axially displaced continuously to travel between a pair of machining guide members while traversing the workpiece, power supply means for applying a succession of electrical pulses across the machining gap flushed with the water medium between the workpiece and the wire electrode to produce time-spaced electrical discharges through the water medium, thereby electroerosively removing material from the workpiece and contouring feed means for displacing the workpiece relative to the traveling wire electrode transversely to the axis thereof along a predetermined path to form the desired contour in the workpiece, the improvement comprising:

ion-exchanger means for controlling the specific resistivity of the water medium delivered by said supply means to the machining gap to be in a range between $10^2$ and $10^5$ ohm-cm

means for introducing abrasive particles into said resistivity-controlled water medium for delivery in suspension therein to said machining gap;

collecting means for receiving the mixture of said water medium and said abrasive particles leaving said machining gap;

first separator means for separating said collected mixture into a liquid component and a solid component;

second separator means for separating said solid component into machining products from said machining gap and abrasive particles;

means for guiding said liquid component to said ion-exchanger means for processing thereby to yield said water medium of said specific resistivity;

mixing means for introducing said abrasive particles yielded from said second separator means into said water medium yielded from said ion-exchanger means; and

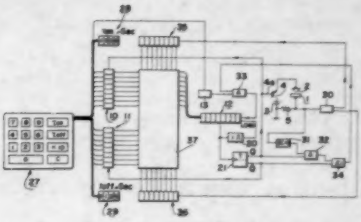
conduit means for guiding the mixture of said water medium and said abrasive particles from said mixing means to said supply means.

4,392,043

## PULSE GENERATOR

Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japax Research Incorporated, Yokohama, Japan

Filed Feb. 27, 1981, Ser. No. 238,744
Claims priority, application Japan, Feb. 28, 1980, 55/23346
Int. Cl.³ B23P 1/02
U.S. Cl. 219—69 P 8 Claims



1. A pulse generator comprising:

on-time setting means for selectively setting on-times;

a first matrix circuit for producing a first output signal on a selected output thereof corresponding to a particular on-time set in said on-time setting means;

off-time setting means, independent of said on-time setting means, for selectively setting off-times;

a second matrix circuit, independent of said first matrix circuit, for producing a second output signal on a selected output thereof corresponding to a particular off-time set in said off-time setting means;

a clock pulser for producing clock pulses;

a single preset counter means for counting said clock pulses; and

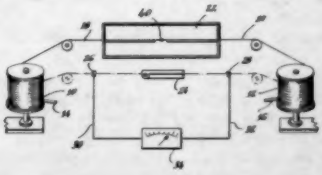
circuit means for establishing, in said single preset counter means, first and second levels to be reached by the clock pulse count in accordance with said first and second output signals, respectively, said circuit means being operable, upon the count of said counter means in a first mode reaching said first level, to switch the latter to said second level and, upon the count of said counter means in a second mode reaching said second level, to switch the latter to said first level, whereby said circuit means provides an on-output signal while said preset counter means is in said first mode and an off-output signal while said preset counter means is in said second mode.

4,392,044

## METHOD FOR DETECTING WHETHER DISSIMILAR METALS ARE BEING WELDED

Teh P. Wang, North Caldwell, and Elmer J. Korn, Bloomfield, both of N.J., assignors to Amax Inc., Greenwich, Conn.

Int. Cl.³ B23K 31/00
U.S. Cl. 219—118 12 Claims



1. A method for detecting whether two dissimilar metals are being welded together comprising the steps of:

a. placing in juxtaposition the edges of two metals that are to be welded together;

b. joining said metals by welding;
c. contacting said metals with electrical leads which are electrically connected to a voltage or current sensing device at points heat conductively remote from the weld, while said weld is hot; and
d. detecting whether an electrical signal is present, to reveal the similarity or dissimilarity of said metals.

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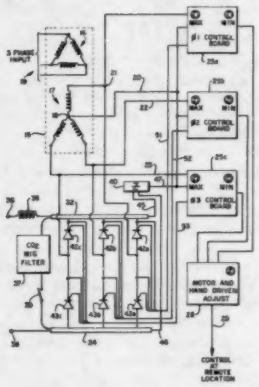
**4,392,045**

## THYRISTOR CONTROLLED WELDING POWER SUPPLY

**Malcolm T. Gilliland, 310 Pine Valley Rd., Marietta, Ga. 30060**

**Filed Feb. 19, 1981, Ser. No. 236,037**
**Int. Cl.³ B23K 9/10**
**U.S. Cl. 219—130.1** **8 Claims**



1. In a three-phase welding power supply for providing welding current to a welder wherein said power supply includes a positive output electrode and a negative output electrode and a three-phase wye connected input source including a neutral terminal, further including, for each phase of said three-phase input,

at least one pair of thyristors connected in series between said positive output electrode and said negative output electrode;

said pair of thyristors being connected to each other at a junction point, each of said thyristors including a gate terminal;

a conductor connected said phase from said input source to said junction point;

the improvement comprising: a control means connected to said phase for providing triggering pulses to said gate terminal in response to the voltage between said phase and said neutral terminal; and

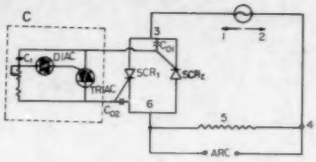
a holding impedance connecting said positive output electrode and said negative output electrode to said neutral terminal for drawing a holding current through one thyristor of said pair of thyristors subsequent to provision of one of said triggering pulses until said voltage between said phase and said neutral terminal substantially returns to zero.

**4,392,046**

## ELECTRONIC DEVICE FOR ARC WELDING EQUIPMENT

**Huann-Jang Tzeng, No. 78, Shu-Jen Rd., Pen-Tang Tsuen, Wu-Feng Hsiang, Taichung Hsien, Taiwan**

**Filed Mar. 26, 1981, Ser. No. 247,867**
**Int. Cl.³ B23K 9/10**
**U.S. Cl. 219—130.1** **4 Claims**



1. An electronic device for arc welding equipment having a load arc, comprising; a voltage regulating portion, and a controlling portion which controls said voltage regulating portion; said voltage regulating portion comprising two thyristors electrically connected to allow a first half cycle of alternating current to pass through one of the two thyristors and a second half cycle of said alternating current to pass through the other of said thyristors under the control of said controlling portion; said controlling portion comprising a RC circuit having a capacitor, changeable resistance, a DIAC, and a TRIAC in electrical connection with said voltage regulating portion such that the application of alternating current will first charge the capacitor of said RC circuit to a potential sufficient to trigger said DIAC which in turn triggers said TRIAC, said TRIAC in turn causing said thyristors to be alternately rendered conductive during alternate half-cycles.

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**4,392,047**

## NON-CONSUMABLE ELECTRODE

**David G. Bykhovsky, ulitsa Esenina, 32, korpus 2, kv. 35; Albert A. Voropaev, ulitsa Manchesterskaya, 12, kv. 40; Evgeny F. Olennikov, ulitsa Ziny Portnovoi, 1, kv. 80, and Alla V. Lopatina, prospekt Veteranov, 112, kv. 69, all of Leningrad, U.S.S.R.**

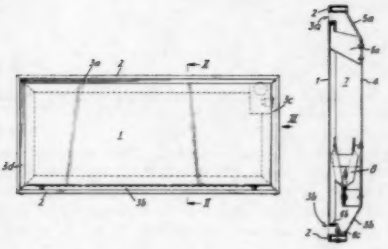
**Filed Feb. 4, 1981, Ser. No. 231,464**
**Claims priority, application U.S.S.R., May 14, 1982, 2916099; May 14, 1982, 2916100**
**Int. Cl.³ B23K 35/04**
**U.S. Cl. 219—145.21** **31 Claims**

1. A non-consumable electrode for use in arc and plasma devices in an inert gas atmosphere, made in the form of a cylinder with a tip, comprising: a holder and an active portion, made of a refractory metal with emission admixtures, connected with said holder wherein the outer side surface of the active portion is exposed to a height exceeding ¼ of the diameter thereof, whereby conditions for transfer of the material from the side surface of the active portion to a work surface thereof are provided.

## 4,392,048
## ELECTRICAL CONVERTOR HEATER

Brian Carter, Paris, France, assignor to Societe Prl, Aubervilliers, France

Continuation of Ser. No. 8,340, Jan. 31, 1979, abandoned. This application Oct. 23, 1981, Ser. No. 314,513
Claims priority, application United Kingdom, Feb. 1, 1978, 4091/78
Int. Cl.³ F24H 9/02, 9/20; H05B 3/02
U.S. Cl. 219—367 7 Claims

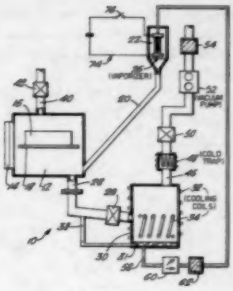


1. A convector heater comprising:
a front plate;
a surround spaced around the periphery of said front plate;
an air gap defined between said front plate and said surround and including a top air gap portion, a bottom air gap portion and two lateral end air gap portions, said top, bottom and lateral end air gap portions being of similar width and said air gap being continuous around the entire periphery of said front plate;
a back plate connected at the periphery thereof to said surround and spaced from said front plate;
a convection air space defined between said front plate and said back plate, said convection air space being directly connected to and opening into the surrounding atmosphere around the entire periphery of said front plate through said top, bottom and two lateral end air gap portions;
heat exchanger means disposed in said convection air space at the bottom thereof for inducing a primary convection air flow inwardly through said bottom air gap portion at the bottom of said front plate; upwardly through said convection air space, and outwardly through said air gap portion at the top of said front plate, and for causing said primary convection air flow to induce secondary convection air flows inwardly through said lateral end air gap portions, upwardly through said convection air space, and outwardly through said top air gap portion; and
control means disposed at one of the top corners of said convection air space, the arrangement being such that the air flow impinging on said control means includes air from said secondary air flow entering through said respective lateral end air gap portion and is cooler than said primary convection air flow leaving said top air gap portion.

## 4,392,049
## CONDENSATION HEATING APPARATUS AND METHOD

Peter D. Bentley, Brighton, and James F. Pollock, Hook, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Division of Ser. No. 150,429, May 16, 1980, Pat. No. 4,327,271. This application Jul. 20, 1981, Ser. No. 286,382
Claims priority, application United Kingdom, May 18, 1979, 7917469; May 9, 1980, 8015528
Int. Cl.³ F27D 11/00
U.S. Cl. 219—401 8 Claims



1. A method of heating an article by the condensation thereon of a vapour, the method comprising,
(a) placing an article to be heated in a heating chamber;
(b) closing the heating chamber;
(c) reducing the pressure inside the heating chamber;
(d) passing a liquid through a permeable electrically conducting heating matrix outside the heating chamber so as to produce a vapour from the liquid;
(e) introducing the vapour into the heating chamber so as to heat the article by the condensation thereon of the vapour, and
(f) removing the vapour from the heating chamber after the article has been heated.

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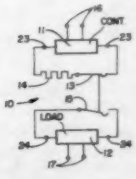
## 4,392,050
## RAPID RESPONSE THERMAL SWITCH FOR ISOLATED LOAD CONTROL

Otto J. Cousins, Burbank, Ill., assignor to Harper-Wyman Company, Hinsdale, Ill.

Filed Apr. 20, 1981, Ser. No. 255,660
Int. Cl.³ H05B 1/02
U.S. Cl. 219—491 11 Claims




1. A thermal switch for controlling the energization of a load in response to a control signal from a controller, said thermal switch comprising:
a bimetallic actuator;
an electrical heater adjacent said bimetallic actuator;
a first set of contacts movable between open and closed

positions in response to movement of said bimetallic actuator;

a control circuit including said first set of contacts and said heater, adapted to be connected to said controller for energization of said heater with the control signal when said first set of contacts is in said closed position;

a second set of contacts electrically isolated from said first set of contacts and being movable between closed and open positions in response to movement of said bimetallic actuator;

means responsive to movement of said bimetallic actuator for operating said second set of contacts between said closed and open positions;

a load circuit including said second set of contacts, adapted to be connected to said load and to a power source for energization of said load once said second set of contacts is in said closed position;

said bimetallic actuator having a normal position when unheated, said first set of contacts being closed and said second set of contacts being open in said normal position; and

said bimetallic actuator being movable in response to heat from said energized heater to a position wherein said second set of contacts closes and in response to additional heat from continued energization of said heater to a position wherein said first set of contacts opens and said second set of contacts remains closed.

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**4,392,051**

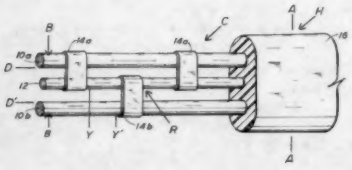
## PARALLEL-TYPE HEATING CABLE

**David C. Goss, and Daniel R. Springs, both of San Marcos, Tex., assignors to Thermon Manufacturing Company, San Marcos, Tex.**

**Division of Ser. No. 188,354, Sep. 19, 1980, Pat. No. 4,345,368. This application Sep. 8, 1981, Ser. No. 299,786**

**Int. Cl.³ H05B *3/34***

**U.S. Cl. 219—528** **10 Claims**



1. A parallel-type heating cable, comprising:

(a) a first and second bus wire arranged in a spaced apart essentially parallel relationship for carrying electrical current;

(b) an electrically resistive heating element arranged essentially parallel to said bus wires for generating joule heat;

(c) a plurality of electrically conductive splices, each of said splices deformed alternately about said first bus wire and heating element and said second bus wire and heating element to establish an alternating series of mechanical-electrical connections between said first bus wire and heating element and said second bus wire and heating element, thereby forming a heating core; said splices mechanically maintaining said first and second bus wires and said heating element in said spaced apart essentially parallel relationship; and

(d) a protective cover encasing said heating core.

**4,392,052**

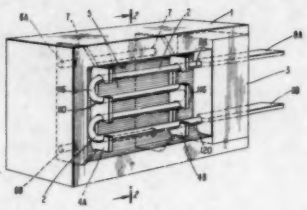
## DEVICE FOR CARRYING ELECTRICAL RESISTANCE ELEMENTS

**Bengt Magnusson, Hallstahammar, Sweden, and Hans Gürtler, Roedermark, Fed. Rep. of Germany, assignors to Bulten-Kanthal AB, Hallstahammar, Sweden**

**Filed Apr. 3, 1981, Ser. No. 250,898**

**Int. Cl.³ H05B *3/06***

**U.S. Cl. 219—532** **10 Claims**



1. Apparatus replaceably carrying an electrical resistance element for a furnace, comprising:

a block of ceramic fibrous material,

said electrical resistance element being mounted on said block and being of serpentine configuration having a plurality of adjacent generally U-shaped portions defined by straight shanks and curved segments interconnecting said straight shanks, the end ones of said U-shaped portions terminating in elongated terminals extending toward a common side of said block from which said electrical resistance element is inserted, said U-shaped portions being arranged to open alternately toward and away from said common side,

at least one plate-shaped carrying element of electrically insulative material mechanically fastened in said block and including a portion protruding from said block, said protruding portion including a plurality of through-passages into which can be slidably inserted said U-shaped portions which open toward said common side,

said through-passages each including side wall means and transverse wall means, said side wall means of each through-passage being arranged opposite the respective straight shanks of the associated U-shaped portion to restrain movement of said electrical resistance element within its own plane and transversely of the direction of insertion and removal of said electrical resistance element, said transverse wall means extending across the associated through-passages to prevent removal of said electrical resistance element from said through-passages in a direction perpendicular to said plane,

said at least one plate-shaped carrying element being spaced from the adjacent curved segments of said U-shaped portions.

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**4,392,053**

## OPTICAL PROBE

**Karlheinz H. Bockholt, Delavan, Wis., assignor to Western Publishing Inc., Racine, Wis.**

**Filed Aug. 25, 1981, Ser. No. 296,037**

**Int. Cl.³ G06K *13/06, 7/10***

**U.S. Cl. 235—472** **9 Claims**

1. A hand-held probe for scanning an optical code comprising:

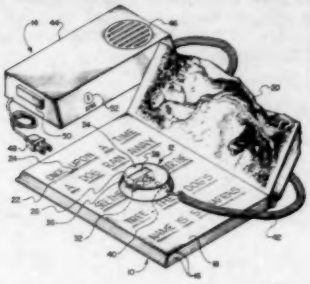
a length of optically clear material comprised in the shape of a cylindrical lens having a central axis;

an optically opaque housing supporting said clear material in axially parallel relationship to the code to be scanned and defining an opening in a first plane which, in use, is adjacent to the code to be scanned;

an optical emitter mounted in said housing and emitting a

beam of radiant energy through said clear material to said opening, said beam being approximately centered relative to said central axis; and

an electro-optical detector, for producing an electronic signal proportional to variations in radiant energy received, mounted in said housing and receiving radiant energy through said lens in a sectional area centered relative to said central axis and directed towards said emitter, whereby radiant energy from said emitter is focused by said lens into a line parallel to said central axis and reflected back through said lens material to said detector.



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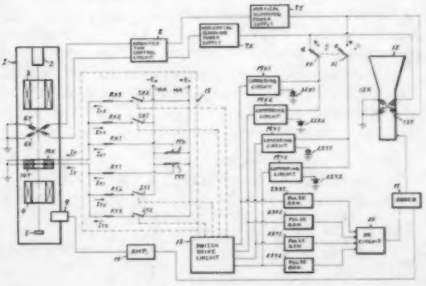
**4,392,054**

## METHOD AND APPARATUS FOR COMPENSATING FOR ASTIGMATISM IN ELECTRON BEAM DEVICES

**Takeshi Sato, and Shunichi Suzaki, both of Akishima, Japan, assignors to Kabushiki Kaisha Nichidenshi Technics, Tokyo, Japan**

**Filed Apr. 15, 1981, Ser. No. 254,523**
**Claims priority, application Japan, Apr. 16, 1980, 55-50119**
**Int. Cl.³ G21K 1/08**
**U.S. Cl. 250—307** **10 Claims**



1. A method for compensating astigmatism in an electron beam device comprising means for generating an electron beam, means including a lens system for focussing the electron beam on a specimen, means for deflecting the beam to cause it to scan over the specimen and means for detecting a signal generated by the interaction of the beam and the specimen surface, an image display means in synchronism with said scanning deflecting system to which the detected signal is applied, and an XY type stigmator equipped with two quadrupole lenses positioned in said lens system for compensating astigmatism, said method comprising:

(a) a step for supplying periodically stepwise changed currents to at least one of said two quadrupole lenses in synchronism with said scanning deflecting means so that different areas on the image of said display means are differently corrected for astigmastism,

(b) a step for visually identifying the area on the image of the said displaying means that is best corrected for astigmatism, and

(c) a step for constantly applying direct currents corresponding to those applied for the image area best corrected for astigmatism in the preceding step to said two quadrupole lenses.

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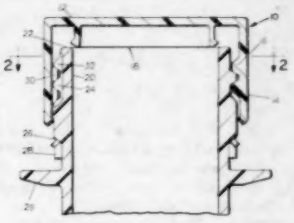
**4,392,055**

## BOTTLE FINISH AND CLOSURE COMBINATION WITH VENTING SLOTS

**Ralph H. Whitney, Whitehouse, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio**

**Filed Aug. 24, 1981, Ser. No. 295,887**
**Int. Cl.³ B65D 51/16**
**U.S. Cl. 215—307** **8 Claims**



1. In combination, a unitary molded thermoplastic closure comprising a disc shaped panel section, an annular skirt depending from the periphery thereof, helical threads formed on the inside annular surface of said skirt, and circumferentially spaced, axially extending slots formed through the threads of said skirt; and a cooperating container comprising an annular finish terminating in an annular rim, helical threads formed on the outside annular surface of said finish and cooperating with said threads on said skirt, means for effecting sealing engagement between said closure and said container finish, and a plurality of circumferentially spaced axially extending slots formed in the outside annular threaded surface of said finish, at least one of said closure slots being alignable with one of said finish slots by opening rotation of said closure sufficient to disengage said sealing means and permit venting of said container.

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**4,392,056**

## CONTROL MARKING DETECTOR

**Ronald R. Weyandt, Chesterland, Ohio, assignor to Automated Packaging Systems, Inc., Twinsburg, Ohio**

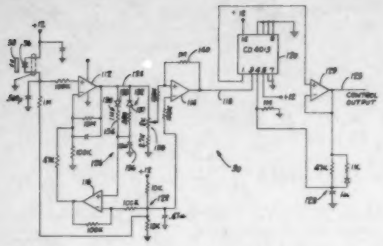
**Filed Apr. 27, 1981, Ser. No. 253,193**
**Int. Cl.³ G01J 1/00; F21V 9/16**
**U.S. Cl. 250—339** **14 Claims**

1. Apparatus for detecting the presence of indicia affixed to an article of manufacture to coordinate an article control function with article movement comprising:

(a) radiation responsive means mounted near a web path of travel to detect radiation from the indicia;

(b) level detection means having a first input coupled to said radiation responsive means and a second input feedback coupled to a detection means output to provide a bias input which causes the detection means output to change

appreciably only in response to abrupt changes of radiation intensity from the web; and



(c) means for sensing changes in said detection means output and for providing a control signal to initiate the control function.

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**4,392,057**

## POSITION-SENSITIVE RADIATION DETECTOR

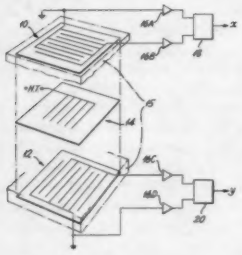
**Ernest Mathieson; Graham C. Smith, and Philip J. Gilvin, all of Leicester, England, assignors to National Research Development Corporation, London, England**

**Filed Feb. 19, 1981, Ser. No. 235,989**

**Claims priority, application United Kingdom, Feb. 22, 1980, 8005981**

**Int. Cl.³ G01T *1/18***

**U.S. Cl. 250—385** **9 Claims**



**1. A position sensitive radiation detector comprising at least one linear array of discrete collector elements spaced apart from one another simultaneously to receive radiation at a plurality of positions defining an extensive radiation-sensitive region, said linear array comprising two interleaved groups of collector elements, each group extending over substantially the whole of said region and comprising elements whose mutual spacing is non-uniform, that of one group increasing from one end of said region to the other and that of the other group decreasing in a complementary manner so that the mutual spacing of the collective elements of said groups is substantially uniform, output means coupled to each of said collector elements to generate an output signal when radiation is incident on the associated collector element, first and second summing circuit means respectively connected to the output means associated with one of said groups of collector elements and ratio-determining circuit means to determine the relative levels of the summed signals for the two groups of signal output means.**

**4,392,058**

## ELECTRON BEAM LITHOGRAPHY

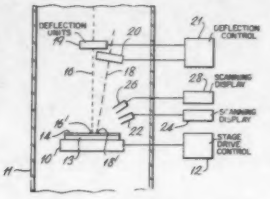
**Kenneth C. A. Smith, Cambridge, England, assignor to National Research Development Corporation, London, England**

**Continuation of Ser. No. 114,318, Jan. 22, 1980, abandoned. This application Aug. 3, 1981, Ser. No. 289,151**

**Claims priority, application United Kingdom, Feb. 2, 1979, 7903825**

**Int. Cl.³ H01J *37/00***

**U.S. Cl. 250—492.2** **14 Claims**



**1. An apparatus for electron beam lithography comprising:**

**means for presenting a substrate for exposure of a desired pattern such that each of a plurality of elemental areas of the substrate is presented in succession for exposure during a respective exposure interval at a single location;**

**a plurality of electron guns, the axes of the guns being relatively inclined for substantial convergence at the substrate, the guns being independently operable to produce electron beams, at least a first gun being constructed and arranged to produce a fine electron beam and at least a second gun being constructed and arranged to produce a coarse electron beam;**

**means for focusing each beam on the surface of the substrate,**

**deflection means for deflecting the beams across the surface; and**

**deflection control means operative to cause said deflection means to produce a portion of the desired exposure pattern which is required to be highly resolved by the continuous deflection of a fine one of said beams across the surface and a different portion of the desired exposure pattern which is required to be less highly resolved by the continuous deflection of a coarse one of said beams across the surface in the elemental area presented during said exposure interval.**

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**4,392,059**

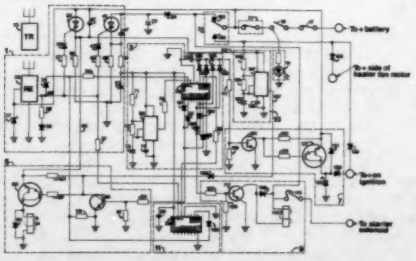
## AUTOMATIC REMOTE CAR STARTER

**Tony Nespor, 2515 Glencoe Rd., Baltimore, Md. 21234**

**Filed Oct. 8, 1980, Ser. No. 195,259**

**Int. Cl.³ F02N *11/08***

**U.S. Cl. 290—38 D** **7 Claims**



**1. A system for remote starting of an engine, comprising:**

**a. engine starting means which includes:**

**means for initiating a series of digital pulses;**

means for activating said digital pulse means;
counting means for counting said series of digital pulses and for translating them into a set of of sequential outputs;
means responsive to certain of said outputs for providing fuel to the engine; and
means responsive to certain of said outputs for providing power to a starting device for the engine; and

b. means controlled by the engine being operated by the starting device, said engine controlled means providing ignition power to the engine and removing power from said engine starting means and the starting device.

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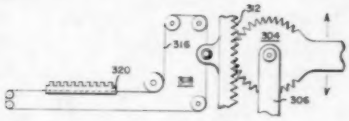
**4,392,060**

## WIND AND WATER POWER GENERATOR

**Jessie T. Ivy, 686 W. Shore Dr., Anacortes, Wash. 98221**

**Filed Oct. 27, 1980, Ser. No. 201,343**
**Int. Cl.³ F03B *13/12***
**U.S. Cl. 290—53** **1 Claim**




1. An apparatus for generating electricity from the power of tides and waves in a body of water, comprising:
a support affixed to the ground near the shore of a body of water;
a float in the body of water capable of reciprocal motion under the action of waves and tides;
a rigid actuator arm coupling the motion of the float to the support;
an electrical generator operatively associated with the float and support;
a rack and gear assembly coupled between the support and the generator and capable of converting the reciprocal motion of the float both upwardly and downwardly into electrical energy;
wherein the support has a movable rack which is coupled to a pinion gear on the rigid actuator arm and wherein the movable rack is coupled through a cable and roller assembly to two ratcheted pairs of gears, so that one pair of gears operates the generator in response to upward movement of the float and the other pair operates the generator in response to downward movement of the float.

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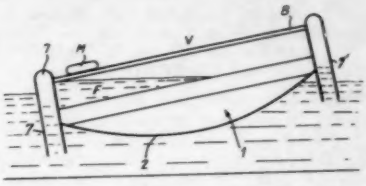
**4,392,061**

## APPARATUS FOR UTILIZING THE ENERGY OF WAVE SWELLS AND WAVES

**Yves Dubois, 95, avenue Poincare, 59700 Marcq en Baroeul, and Francois Y. Dubois, 13, rue de la Poissonnerie, 22100 Dinan, both of France**

**Filed Mar. 1, 1982, Ser. No. 353,104**
**Claims priority, application France, Feb. 27, 1981, 81 04375**
**Int. Cl.³ F03B *13/12***
**U.S. Cl. 290—53** **13 Claims**

1. Apparatus for utilizing the energy of sea swells and waves, characterized by the following combination:
(a) a vessel anchored at a place of anchorage and adapted to float on the surface of and to follow the undulations of the sea swells at the place of anchorage, said vessel having a bow, a stern, a hull, an upper deck disposed above the water internally of the hull and at least one intermediary deck located between the upper deck and the bottom of the hull;
(b) means positioning said vessel to face the sea swells so as to enable said vessel to pitch and not roll while anchored, said positioning means including anchoring means to anchor the vessel and maneuvering means to prevent the vessel from swinging at anchor;
(c) control means to modify the amplitude of the pitching of the vessel, said control means including at least one hollow, vertical air cylinder located at the bow and at the stern, respectively, of the vessel, said cylinders being closed at their upper ends;
(d) plural water-tight compartments disposed on at least one of the decks of the vessel and extending longitudinally of the vessel, each compartment comprising a conduit for containment and flow of a drive liquid which moves back and forth internally of the hull along the length of the vessel with the frequency of the pitching thereof;



(e) at least one prime mover located in the path of the moving liquid and adapted to harness the energy from the moving liquid and convert it to mechanical energy which can be utilized to drive at least one electric generator, said prime mover including a rotatable power output shaft;
(f) deflectors located at the extremities of the water-tight compartments and adapted to reduce the impact of the moving liquid when the liquid reaches the end of a compartment during completion of its downstroke as the result of the pitching of the vessel; and
(g) longitudinal bulkheads defining and separating parallel water-tight compartments to prevent lateral flow of the drive liquid, thereby minimizing listing of the vessel.

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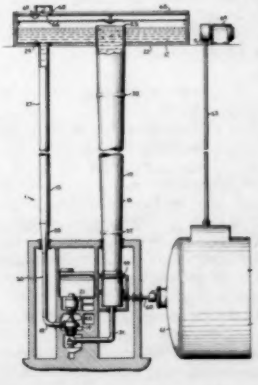
**4,392,062**

## FLUID DYNAMIC ENERGY PRODUCING DEVICE

**Dale R. Bervig, 10235 Oakmont Cir., Lenexa, Kans. 66215**

**Filed Dec. 18, 1980, Ser. No. 217,654**
**Int. Cl.³ F01K *25/04*; F04F *1/18***
**U.S. Cl. 290—54** **24 Claims**



1. A fluid dynamic device comprising:
(a) a loop having a downcomer leg and a riser leg and adapted to receive a fluid;
(b) electrical generating means positioned between said legs and communicating therewith near a lower end thereof

such that fluid in said downcomer leg may pass through said generating means into said riser leg, thereby motivating said generating means to produce power;

(c) injection means for injecting a substance having a relatively lower density than said fluid into said fluid in said riser leg at a location vertically spaced below the top of said downcomer leg; and wherein

(d) said riser leg substantially diverges near said injection means such that the diameter of said riser leg substantially increases immediately adjacent said injection means.

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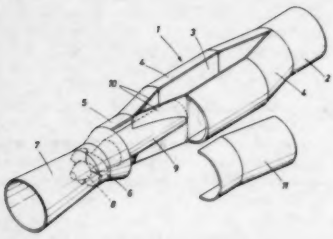
4,392,063

## TURBINE INSTALLATION COMPRISING A TURBINE INSTALLED IN A DUCT

Herman A. Lindquist, San Rafael, Calif., assignor to Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Mar. 23, 1981, Ser. No. 246,581
Int. Cl.³ F03B 11/02
U.S. Cl. 290—54 4 Claims



1. A turbine installation comprising

(a) flow passage-defining means which comprises

(1) two juxtaposed pipelines defining interconnecting passages spaced apart in an intermediate part of their length to define a space therebetween, the pipelines being disposed on opposite sides of an imaginary plane,

(2) an inlet chamber at one end of the pipelines, the inlet chamber having an outlet communicating with each one of the interconnecting passages,

(3) a runner chamber at an end of the pipelines opposite the one end and having an inlet communicating with each one of the interconnecting passages, and

(4) a cylindrical feed pipe leading from the opposite end of the pipelines to the runner chamber,

(b) a turbine runner mounted in the runner chamber for rotation of a fixed axis, the imaginary plane containing said axis,

(c) an electric generator disposed outside the flow passage-defining means,

(d) an output mechanism extending through the space and operatively connecting the runner to the generator, the output mechanism comprising

(1) a turbine shaft for rotation on said axis and non-rotatable connected to the runner, the pipelines being composed of a plurality of pipe sections extending substantially parallel to the axis and having a cross-section that is substantially the same as that part of the cross-section of the inlet chamber at the outlet which is disposed on the same side of the plane as the respective pipeline, and the feed pipe converging to form a junction near the inlet of the runner chamber,

(e) a carrying tube centered on said axis and radially spaced from, and surrounding, the turbine shaft, the carrying tube extending through, and being sealed in, both pipelines adjacent the junction and the carrying tube protruding into the space, on the one hand, and the cylindrical feed pipe, on the other hand, and

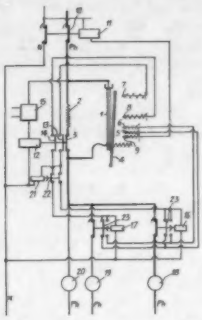
(f) a bearing for the turbine shaft mounted in the carrying tube.

4,392,064

## UNBALLASTING RELAYS

Rosette Alberti, 7 rue Marie Bonaparte, 92 210, Saint-Cloud, France

Filed Jan. 26, 1981, Ser. No. 228,087
Claims priority, application France, Jan. 25, 1980, 80 01607
Int. Cl.³ H02J 13/00
U.S. Cl. 307—39 5 Claims



1. A process for using an electrical network provided with a modification of the power available to the user by telecontrol through a control signal emitted in the network to control the modification of the threshold of the tripping of circuit breakers, comprising emitting a signal in the network substantially simultaneously with the control signal for modification of the threshold of tripping the circuit breakers, to modify the control power or operating level of the associated unloading relay.

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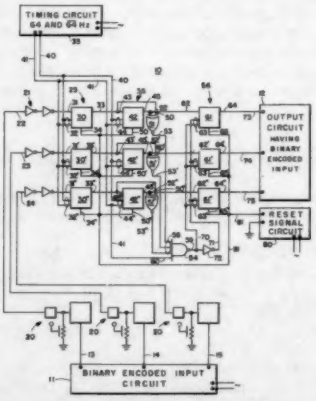
4,392,065

## ELECTRONIC CIRCUIT FOR ELIMINATING CHATTER

Ralph E. Stiglich, Cedar Crest, N. Mex., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 18, 1981, Ser. No. 275,004
Int. Cl.³ H03K 17/56
U.S. Cl. 307—247 A 10 Claims




1. An electronic circuit for eliminating from at least two input switches the effect of contact bounce, comprising

a first group of a first and a second switch means each having two input circuits and one output circuit whereby upon an identical input signal appearing on said two input circuits an output signal exists on said output circuit,

first circuit means connecting each of the two input switches

providing an input signal to one of said two input circuits of said first and second switch means,

a source of timing pulses connected to the other of said two input circuits of said first and second switch means,

a second group of a third and fourth switch means each having two input circuits and one output circuit whereby upon an identical input signal appearing on said two input circuits an output signal exists on said output circuit,

second circuit means connecting each of said one output circuits of said first and second switch means to one of said input circuits of said third and fourth switch means,

third circuit means connecting said source of timing pulses to a second of said two input circuits of said third and fourth switch means,

fifth and sixth switch means having two input circuits and an output circuit whereby upon an input signal appearing on each of said two input circuits an output signal exists on said output circuit,

fourth circuit means connecting said output circuit of said first and third switch means to one of said input circuits of said fifth switch means and said output circuit of said second and fourth switch means to said input circuits of said sixth switch means,

a seventh switch means having at least three input circuits and an output circuit whereby upon identical input signals appearing on all three input circuits, an output signal exists on said output circuit,

fifth circuit means connecting said output circuits of each of said fifth and sixth switch means to a first and second input circuits of said seventh switch means and said source of timing pulses to a third input circuit of said seventh switch means,

a third group of an eighth and ninth switch means each having two input circuits and an output circuit, whereby upon an identical input signal appearing on each of said two input circuits an output signal exists on said output circuit, and

means connecting said output of each of said third and fourth switch means to one of said input circuits of said eighth and ninth switch means respectively and said output circuit of said seventh switch means to each of the other input circuits of said eighth and ninth switch means to provide an output signal at said output circuits of said eighth and ninth switch means indicative of the input signal of the input switches after the contact bounce of the two input switches has terminated.

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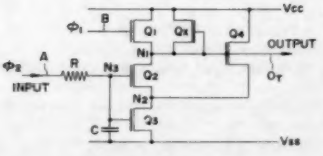
**4,392,066**

## SCHMIDT TRIGGER CIRCUIT

**Hiroshi Hirso, Kawasaki, Japan, assignor to Fujitsu Limited, Kanagawa, Japan**

**Filed Dec. 23, 1980, Ser. No. 219,496**
**Claims priority, application Japan, Dec. 29, 1979, 54/171184**
**Int. Cl.³ H03K *3/295;* H03L *1/00***
**U.S. Cl. 307—290** **5 Claims**




1. In a Schmidt trigger circuit which is provided with at least first, second and third transistors which are series-connected at their respective sources and drains between a power source line and a ground line, and a fourth transistor which has its gate connected to a first node at the series connection of the first and second transistors to apply a feedback current from the drain of said fourth transistor to a second node at the series connection of the second and third transistors, the improvement comprising

a fifth transistor connected between the power source line and the first node,

wherein said fifth transistor allows said first node to discharge to said power source line when, after said first node is charged to a voltage corresponding to an initial voltage of said power source line, said voltage of said power source line decreases to a level below a level corresponding to said voltage on said first node,

whereby variations in a time delay provided by said Schmidt trigger circuit, as a result of the variation in the voltage of said power source line, may be reduced.

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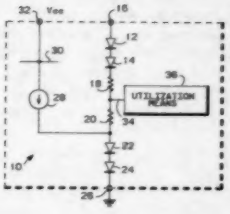
**4,392,067**

## LOGIC SELECT CIRCUIT

**John J. Price, Jr., Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Feb. 18, 1981, Ser. No. 235,397**
**Int. Cl.³ H03L *5/00;* H03K *5/22***
**U.S. Cl. 307—475** **5 Claims**




1. A logic select circuit for providing a multi-level logic threshold signal at an output thereof, comprising:

first diode means coupled between a first terminal and a first circuit node;

second diode means coupled between a second terminal at which is supplied a ground reference potential and a second circuit node;

circuit means coupled between said first and second circuit nodes and to the output of the logic select circuit; and

current source means coupled to said second circuit node for providing a predetermined current thereto such that a first logic threshold signal of a first level is produced at the output of the logic select circuit and second logic threshold signal of a second level is produced when said first terminal is connected to a source of operating potential supplied to the logic select circuit.

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**4,392,068**

## CAPACITIVE COMMUTATING FILTER

**Kenneth B. Welles, II, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Jul. 17, 1981, Ser. No. 284,157**
**Int. Cl.³ H03K *5/24, 5/26;* H03D *13/00***
**U.S. Cl. 307—522** **10 Claims**

1. A commutating filter for detecting the presence of a waveform substantially at a selected frequency, comprising:

input terminal means for receiving the waveform;

output terminal means;

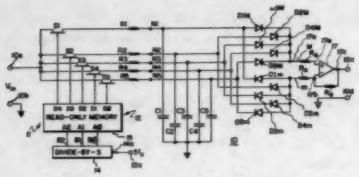
a differential amplifier having an inverting input, a non-inverting input and an output connected to said output terminal means;

a first plurality N, where N is an integer greater than one, of resistance elements each having a first terminal and a second terminal;

a second plurality 2N+1 of capacitive filter elements;

means responsive to said selected frequency for simulta-

neously connecting, in sequential but overlapping and cyclical manner, N adjacent ones of said capacitive filter elements each in series with an associated one of the plurality N of resistance elements to the signal at said input terminal means to cause D.C. equilibrium voltages to appear across each of said capacitive filter elements only when the input terminal waveform has a frequency substantially equal to the selected frequency;



means for respectively coupling only the greatest positive-polarity and negative-polarity D.C. equilibrium voltages established across different ones of the plurality of capacitive filter elements selected ones of the differential amplifier inputs to cause a D.C. voltage of level proportional to the amplitude of the selected frequency waveform to appear at said output terminal means.

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**4,392,069**

**SEMICONDUCTOR SWITCH**

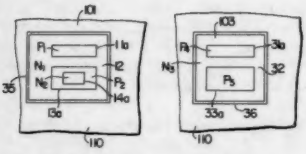
**Masayoshi Suzuki, Hitachiota, and Akio Sagawa, Hitachi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 18, 1980, Ser. No. 170,180**

**Claims priority, application Japan, Jul. 20, 1979, 54-91524**

**Int. Cl.³ H03K *17/72, 17/16***

**U.S. Cl. 307—252 A** **20 Claims**



1. A semiconductor switch comprising:

a thyristor of four semiconductor layers PNPN with three PN junctions and with anode, cathode and gate electrodes;

a first transistor coupled to said thyristor to short-circuit at least one PN junction of said thyristor upon saturation of said first transistor; and

a second transistor provided between the anode side of said thyristor and the base of said first transistor to cause the saturation of said first transistor in accordance with a voltage which is applied to the anode of the thyristor, wherein three continuous layers with two PN junctions of said thyristor of the PNPN structure constitute a third transistor, and further wherein said second transistor has a three-layer structure having a plane diffused pattern similar to a plane diffused pattern of said three-layer structure third transistor.

**4,392,070**

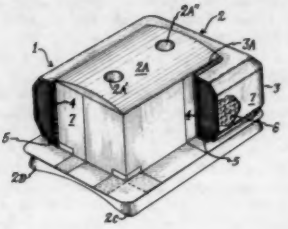
**INSULATED COIL ASSEMBLY AND METHOD OF MAKING SAME**

**Joseph J. Zdaniewski, Erie, Pa., assignor to General Electric Company, Research Triangle Park, N.C.**

**Filed Apr. 16, 1981, Ser. No. 254,689**

**Int. Cl.³ H02K *1/04*; H01B *7/00***

**U.S. Cl. 310—43** **4 Claims**



1. An insulated coil assembly for a field pole of a dynamoelectric machine, said coil assembly comprising; a coil of conductive wire coated with an insulating varnish and arranged to define a multi-side window for receiving therein a portion of a field pole, a lapped layer of open-weave glass fiber tape positioned snuggly around each of the respective sides of said coil to entirely cover the coil, and a substantially void free, continuous, crack-resistant, thermoset dipping compound that is thermally stable in a range of temperature from −50° C. to 150° C., forming a cured solid ringing coating that is generally uniformly distributed over the surface of the coil and is supported in a generally uniform thickness by said tape.

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**4,392,071**

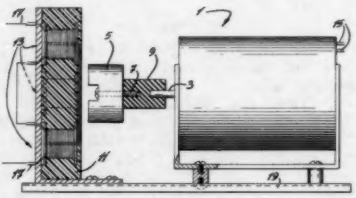
**GENERATOR FOR UNDERWATER LIGHTING SYSTEMS**

**Richard Gauthier, 38 Glen Rd., Morin Heights, Quebec, Canada**

**Filed Jul. 13, 1981, Ser. No. 282,390**

**Int. Cl.³ H02K *47/04***

**U.S. Cl. 310—113** **7 Claims**



1. For an underwater lighting system, a low current, low voltage generator, comprising:

an AC motor having an output shaft extending along a first axis;

means mounting a magnet for rotation with said shaft about said first axis;

said magnet being electrically isolated from said AC motor;

a coil arrangement, comprising an even number of coils, disposed in a plane perpendicular to said first axis, and spaced from said magnet, said coil arrangement having a longitudinal axis which is parallel with said first axis;

said coil arrangement being electrically isolated from said magnet;

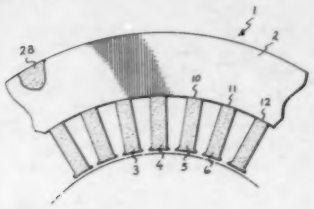
whereby, rotation of said magnet produces an EMF in said coil arrangement to provide a low current, low voltage AC output at the output of the coil arrangement.

4,392,072

## DYNAMOELECTRIC MACHINE STATOR HAVING ARTICULATED AMORPHOUS METAL COMPONENTS

George M. Rosenberry, Hendersonville, Tenn., assignor to General Electric Company, Fort Wayne, Ind.

Filed Sep. 13, 1978, Ser. No. 942,009
Int. Cl.³ H02K 1/00, 15/12
U.S. Cl. 310—216 9 Claims




1. A dynamoelectric machine stator comprising a coil of amorphous metal alloy ribbon arranged to form a cylindrical yoke, a plurality of articulated teeth each separately mounted, respectively, at arcuately spaced intervals on the inner surface of said cylinder to define a plurality of axially extending winding slots between the teeth, each of said teeth comprising a formed body consisting essentially of amorphous metal particles and a bonding material for holding the particles in fixed relationship within said formed body, and holding means comprising a bonding material disposed between each tooth and the yoke for securing the teeth in fixed relation to said yoke.

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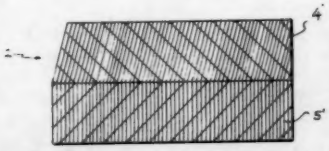
4,392,073

## DYNAMOELECTRIC MACHINE STATOR HAVING CONCENTRIC AMORPHOUS METAL LAMINATIONS AND METHOD OF MAKING SAME

George M. Rosenberry, Jr., Hendersonville, Tenn., assignor to General Electric Company, Fort Wayne, Ind.

Filed Sep. 15, 1978, Ser. No. 942,852
Int. Cl.³ H02K 1/00
U.S. Cl. 310—216 11 Claims




1. A dynamoelectric machine stator comprising a first edgewound helix of amorphous metal ribbon arranged with its adjacent turns stacked on one another to form a first cylinder, a second edgewound helix of amorphous metal ribbon arranged with its adjacent turns stacked on one another to form a second cylinder, each of the turns of said second helix being frusto-conical in configuration, said second cylinder being mounted concentrically with the first cylinder.

4,392,074

## TRIGGER DEVICE AND PIEZO-IGNITION COUPLER WITH GALVANIC DECOUPLING

Peter Kleinschmidt, and Valentin Magori, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Apr. 9, 1981, Ser. No. 252,298
Claims priority, application Fed. Rep. of Germany, Sep. 19, 1980, 3035503; Oct. 28, 1980, 3040530; Oct. 30, 1980, 3040916
Int. Cl.³ H01L 41/08
U.S. Cl. 310—327 22 Claims

1. A device for triggering an electronic switch comprising:

a piezo-ignition coupler for supplying a trigger signal to said electronic switch, said piezo-ignition coupler consisting of

a lamina of piezo-ceramic material,

at least two electrodes disposed on one surface of said lamina and a like number of counter-electrodes disposed on the opposite side of said lamina in at least substantial registry therewith, each of said electrodes and counter-electrodes having a terminal,

said electrodes on a same surface of said lamina being spaced from other by an electrically insulating gap for galvanically decoupling said spaced electrodes,

one electrode on one surface of said lamina and one counter-electrode in at least substantial registry therewith on the opposite surface of said lamina forming an input pair of electrodes, and another electrode on said one surface of said lamina and another counter-electrode in at least substantial registry therewith on the opposite surface of said lamina forming an output pair of electrodes and being connected to a trigger electrode of said electronic switch,

said lamina having a shape exhibiting an axis with more than two-fold rotational symmetry with a resonant frequency of vibration determined by a single length dimension of the area of said lamina;

a cladding applied adjacent to said surfaces of said lamina and covering a portion of each of said terminals, said cladding consisting of electrically non-conductive material and having a modulus of elasticity which is less than or equal to two tenths of the modulus of elasticity of the piezo-ceramic material comprising said lamina and said cladding having a reciprocal mechanical quality factor Q which is greater than ten; and

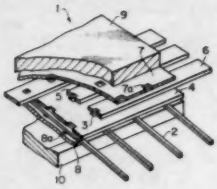
control electronics connected to said input pair of electrodes for generating an alternating current signal having a frequency which is matched to said resonant frequency of said lamina at a value in the range of 20 kHz to 500 kHz for inducing a selected radial oscillation mode in said lamina.

4,392,075

## GAS DISCHARGE DISPLAY PANEL

Takeo Kamegaya, Tokyo; Tadahiko Sekigawa, Saitama; Hiroshi Kurakami, Saitama, and Yoshiro Suzuki, Saitama, all of Japan, assignors to Okaya Electric Industries Co., Ltd., Tokyo, Japan

Filed Apr. 16, 1981, Ser. No. 254,715
Claims priority, application Japan, Apr. 21, 1980, 55-52607; Jun. 30, 1980, 55-89431; Sep. 12, 1980, 55-126923
Int. Cl.³ H01J 61/35
U.S. Cl. 313—584 3 Claims



1. A gas discharge display panel comprising: a front plate; a rear plate; cathode electrodes arranged on said front plate, said cathode electrodes having openings forming discharge cells; and anode electrodes arranged on said rear plate orthogonal to said cathode electrodes in alignment with said openings in said cathode electrodes; and

each of said openings in said cathode electrodes being substantially in the form of a rectangle, the length $D_2$ of one side of which is defined by $40\ \lambda_e \leqq D_2 \leqq 500\ \lambda_e$, and

the thickness T of each of said cathode electrodes being defined by $10\ \lambda_e \leqq T \leqq 100\ \lambda_e$, where $\lambda_e$ is the mean free path of electrons in a gas sealed in said display panel.

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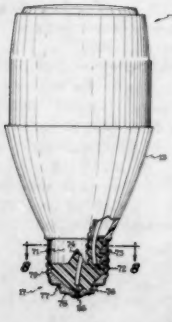
4,392,076

## ATTACHMENT OF BASE TO LAMP UNIT

William E. Ishler, Lyndhurst; William B. Weber, Willoughby Hills, and Livio L. Giudici, Novelty, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 5, 1980, Ser. No. 213,388
Int. Cl.³ H01J 5/48, 5/50
U.S. Cl. 313—318 6 Claims



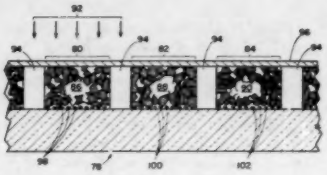
1. A lamp unit comprising a housing and a base positioned over an end of said housing, and means attaching said base and housing together comprising a resin material within said base and said end of the housing, said base and said end of the housing being contoured to engage said resin so that the resin mechanically locks together said base and said housing.

4,392,077

## DEEPLY FILTERED TELEVISION IMAGE DISPLAY

Philomena C. Libman, Mt. Prospect, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Filed Feb. 14, 1979, Ser. No. 11,961
Int. Cl.³ H01J 29/30
U.S. Cl. 313—474 8 Claims



1. In a low cost, deeply filtered image display having a faceplate with a viewing screen including a patterned layer of phosphor particles disposed contiguous to an inner surface thereof which, when excited emits light of a predetermined color, and having means for exciting selected areas of said layer to produce a luminescent informational image, said image being subject to loss of contrast caused by reflection of ambient light from said layer, an improvement comprising a shallow, random, clumped, discontinuous, open dispersion of contrast-enhancing particles of pigment having a body color corresponding generally to said predetermined color located directly on said faceplate beneath said layer and not significantly admixed with said phosphor particles, the percentage of open area of said dispersion of pigment particles and the absorption characteristics thereof being such that said dispersion efficiently filters ambient light at its interface with said layer, first by absorption of directly incident ambient light, and second by absorption of ambient light passing through said open dispersion and scattering back off said phosphor particles to said dispersion, said dispersion representing a tolerable impediment to image light emitted by said phosphor particles due to the shallowness and openness of said dispersion and its non-absorption of light of said predetermined color, said dispersion negligibly absorbing electron beam energy due to its location beneath said layer, making practicable deep filtration of ambient light and thus high picture contrast without a disproportionately countervailing loss in picture brightness.

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4,392,078

## ELECTRON DISCHARGE DEVICE WITH A SPATIALLY PERIODIC FOCUSED BEAM

Milton L. Noble, Liverpool, and Bryan L. Cleaveland, Baldwinsville, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Dec. 10, 1980, Ser. No. 214,917
Int. Cl.³ H01J 25/00
U.S. Cl. 315—4 10 Claims

1. In an electron discharge device in which high speed electrons in a beam, subjected to a spatially periodic magnetic field, pursue helical paths, the deceleration of said electrons producing electromagnetic energy at a given frequency, the combination comprising:

(1) a waveguide having a given phase velocity for waves of said given frequency and a low frequency cut-off below said given frequency.

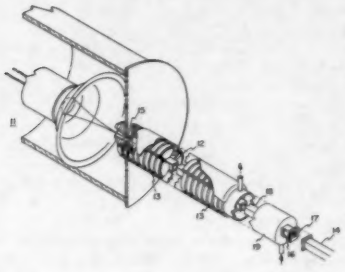
(2) an electron gun for projecting a beam of electrons along the axis of said waveguide at a given velocity, the beam being subject to defocusing forces,

(3) means for producing a circularly polarized transverse magnetic field extending across the interior of the waveguide, the transverse field vector rotating about said waveguide axis at a given pitch which causes the electrons in said beam to pursue helical paths about axes parallel to said waveguide axis and rotating with a pitch equal to that

of said transverse field but mutually displaced by one-quarter rotation,

the electron velocities, the spatial periodicity of said helical paths, and said waveguide parameters being selected to cause a deceleration of said electrons and an increase of electromagnetic energy of said given frequency in said waveguide, and

(4) focusing means for producing a first and a second circularly polarized axial magnetic field, each rotating about said waveguide axis at a pitch equal to that of said helical electron paths, said first circularly polarized axial field having a polarization opposite to that of said second circularly polarized axial field, the two circularly polarized axial fields being interwined and disposed at mutually opposite positions across the axis of the waveguide to



cause the maximum axial field at a given axial coordinate to assume opposite senses at opposite points on the perimeter of said waveguide and a zero value on the waveguide axis, the electrons at said given axial coordinate sharing a common transverse vectorial velocity, of which those lying in two sectors oppositely disposed across said axis are subject to a maximum deflecting force,

the axial field having a rotational sense in relation to that of said electron paths such that said maximum deflecting force is inwardly directed for electrons in both sectors, off-axis electrons in all sectors of said beam being periodically exposed to said maximum inwardly directed force as the beam progresses along said axis, whereby all electrons in said beam experience periodic maximum focusing forces, and beam impingement on the interior of said waveguide substantially prevented.

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**4,392,079**

## METHOD OF ADJUSTING PHASE SHIFT IN AMPLIFICATION MULTICAVITY KLYSTRON AND DEVICE THEREFOR

**Vitaly I. Pasmannik, ulitsa Ostrovityanova, 45, korpus 1, kv. 569, Moscow, and Viktor P. Sakharov, Leninsky raion, poselok Mosrentgen, 29, kv. 50, Moskovskaya oblast, both of U.S.S.R.**

**PCT No. PCT/SU79/00100, § 371 Date Aug. 12, 1980, § 102(e) Date Aug. 11, 1980, PCT Pub. No. WO80/01332, PCT Pub. Date Jun. 26, 1980**

**PCT Filed Oct. 24, 1979, Ser. No. 201,061**

**Claims priority, application U.S.S.R., Dec. 12, 1978, 2695744**

**Int. Cl.³ H01J *25/10***

**U.S. Cl. 315—5.39** **2 Claims**

1. A method of adjusting a phase shift in an amplification multicavity klystron including an input resonator, an intermediate resonator and an output resonator, said method comprising the steps of:

tapping a portion of a signal from the output resonator;

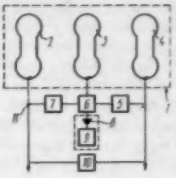
tapping a portion of a signal from the intermediate resonator;

adding the signals tapped from the output and intermediate resonators to obtain a sum signal;

applying the sum signal to the input resonator of the klystron; and

adjusting amplitudes and phases of the tapped signals so that the tapped signals have equal amplitudes but opposite phases;

wherein anode voltage is varied until the phase shift in the klystron changes, and comprising the subsequent step of selecting the phase of the sum signal so as to provide a minimum phase-shift variation in the klystron.



2. A device for adjusting a phase shift in an amplification klystron, comprising an input resonator, an intermediate resonator, an output resonator, and means for transmitting a signal from the output resonator to the input resonator of said klystron, said means for transmitting comprising a phase shifter, a signal adder coupled to the phase shifter, the intermediate resonator and the output resonator, and an additional phase shifter inserted between the adder and the input resonator to provide for selection of the phase of an adjusting signal.

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**4,392,080**

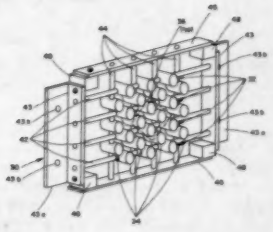
## MEANS AND METHOD FOR THE FOCUSING AND ACCELERATION OF PARALLEL BEAMS OF CHARGED PARTICLES

**Alfred W. Maschke, East Moriches, N.Y., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed May 23, 1980, Ser. No. 152,461**

**Int. Cl.³ H01J *25/10***

**U.S. Cl. 315—5.41** **19 Claims**



1. A planar array of electrostatic quadrupoles including a plurality of electrodes suitable for applying strong focusing forces to a plurality of transversely spaced parallel beams of charged particles, said array forming a unitary structure.

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**4,392,081**

## LIGHTING UNIT

**Thomas A. Brown, Fulton, and William Peil, North Syracuse, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.**

**Filed Jul. 31, 1981, Ser. No. 288,855**

**Int. Cl.³ H02K *17/34*; H02P *1/54***

**U.S. Cl. 315—46** **26 Claims**

1. A lighting unit comprising:

A. a dc power supply having two output terminals,

B. a filamentary lamp and an arc lamp,

C. an operating network comprising:

(1) a transformer having

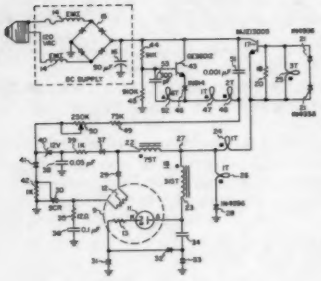
(a) a core of substantially linear magnetic material forming a first, main magnetic path, aperture means defining a second magnetic path lying within said main magnetic path of lower reluctance than said main magnetic path,

(b) a first and a second power winding coupled to said main magnetic path, current flow in either power winding generating flux which has one sense in one segment and an opposing sense in a second segment of said second magnetic path, and

(c) flux level dependent control means comprising a primary feedback winding and a secondary feedback winding passing through said aperture means and coupled to said second magnetic path,

(2) a normally nonconductive switching transistor connected to intermittently complete a current path through said primary feedback winding between one said supply output terminal and a node;

said secondary feedback winding being coupled across the input electrodes of said transistor for application



of an initial conduction aiding feedback after transistor turn-on, continuing until one segment of said magnetic path becomes saturated, and a conduction inhibiting feedback thereafter, returning said transistor to a nonconductive state after a certain ON time,

(3) a primary power circuit for operating said filamentary lamp comprising said first power winding and said filamentary lamp in series, connected between said node and the other said supply output terminal,

(4) a secondary power circuit for starting and operating said arc lamp comprising said second power winding and said arc lamp connected in series between said first node and said other supply output terminal, said second power winding providing transformed starting potentials when said primary circuit is active,

(5) current maintenance means connected in circuit with said power windings for allowing current flow in said power windings during the transistor OFF time,

(6) switching means responsive to the state of said arc lamp for inactivating said primary power circuit when the arc lamp is warmed up, and

(7) means for repetitively turning on said switching transistor.

**4,392,082**

## PRESSURE-SENSITIVE IGNITION PLUG

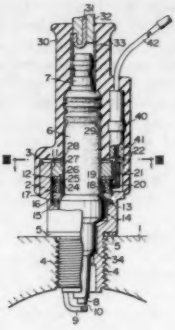
**Koji Harada, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Aug. 5, 1981, Ser. No. 290,108**

**Claims priority, application Japan, Aug. 15, 1980, 55-111665; Aug. 22, 1980, 55-116064**

**Int. Cl.³ H01T *13/00***

**U.S. Cl. 315—55** **6 Claims**



1. A pressure-sensitive ignition plug comprising an insulator assembly accommodating a central electrode to which electric current of a high voltage is applied, a metallic plug body concentrically supporting said insulator assembly and provided with a threaded portion at which said plug body is mounted on an engine, said plug body having a grounded electrode opposing to said central electrode to form therebetween a sparking gap, and a pressure sensing unit incorporated in said plug body and adapted to sense the internal pressure of a cylinder of said engine, wherein said pressure sensing unit has an annular form and is disposed in an annular gap formed between said insulator assembly and said plug body in such a manner as to be able to detect a change in the internal pressure of said cylinder through the displacement of said insulator assembly, said pressure sensing unit having an upwardly projecting signal terminal for transmitting the sensing output, and an amplifier unit for amplifying the sensing output is detachably connected to said pressure sensing unit through said signal terminal.

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**4,392,083**

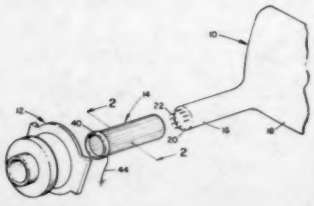
## RADIATION SHIELD FOR A CATHODE RAY TUBE

**Louis B. Costello, Niles, Ill., assignor to Teletype Corporation, Skokie, Ill.**

**Filed Nov. 20, 1981, Ser. No. 323,217**

**Int. Cl.³ H01J *1/52***

**U.S. Cl. 315—85** **9 Claims**



1. An electromagnetic radiation shield (14) adapted for use with a cathode ray tube (10) having a neck (16) wherein means are housed for producing a modulated electron beam deflected

within the cathode ray tube (10) by a yoke coil (12) which generates a magnetic field, the radiation shield comprising:

a sleeve (24) of insulating material having inner and outer surfaces and an inner diameter greater than the outer diameter of the neck (16) of the cathode ray tube (10) thus allowing the sleeve (24) to be positioned on the neck (16) of the tube (10),

a plurality of first, spaced apart, parallel, conductive, elongated strips of material (30, 32) extending along the inner surface of the sleeve (24) and bonded to the inner surface (26, 28) thereof,

a plurality of spaced apart, parallel, second, conductive, elongated strips of material (32) extending along a surface of the sleeve (24) and bonded to the outer surface (28) thereof, said first conductive strips (30) being offset from said second conductive strips (32), and

means (40, 42) for electrically connecting one end each of said first and second conductive strips (30, 32) to a ground potential, whereby electromagnetic radiation from the cathode ray tube (10) is highly attenuated and the magnetic field generated by the yoke (12) is allowed to pass through the shield (14) with relatively low attenuation.

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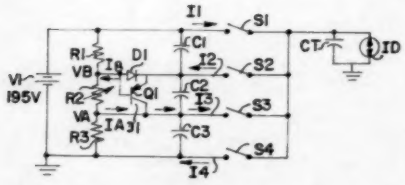
**4,392,084**

## SUSTAINER CIRCUIT FOR PLASMA DISPLAY PANELS

**Thomas J. Rebeschi, North Haven, and Mohan L. Kapoor, Orange, both of Conn., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Mar. 13, 1981, Ser. No. 243,292**
**Int. Cl.³ H05B *37/00, 41/14;* H02J *1/00***
**U.S. Cl. 315—169.4** **4 Claims**



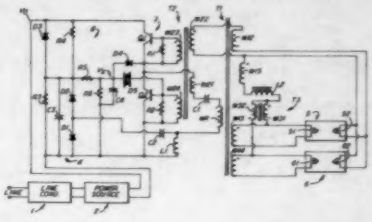

1. A voltage supply circuit for a gaseous discharge display panel comprising two closely spaced parallel transparent dielectric plates having respective sets of interior parallel electrodes, one set being orthogonal to the other to form a matrix of closely spaced intersections, a gaseous medium enclosed between said plates and filling the spaces between said intersections, a power supply having positive and reference terminals, a voltage divider network including first, second and third resistors connected in series between said power supply terminals to provide three predetermined voltage levels for operating said panel, first, second, and third capacitors connected in series across said voltage divider, each capacitor being in parallel with a respective said resistor, a selectively active shunt circuit switching means connected to said second resistor and capacitor, and means for selectively connecting said voltage divider network to said panel to provide writing, erasing and sustaining voltages at selected discrete levels to selected intersections of said panel.

**4,392,085**

## DIRECT DRIVE BALLAST WITH DELAYED STARTING CIRCUIT

**William C. Knoll, Turbotville, and David L. Bay, Muncy, both of Pa., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Dec. 19, 1980, Ser. No. 218,386**
**Int. Cl.³ H05B *37/00, 39/00***
**U.S. Cl. 315—173** **16 Claims**



1. A delayed starting circuit for an electronic ballast system that includes an inverter for driving a fluorescent lamp, a primary voltage source, and a secondary voltage source derived from the inverter output signal, said starting circuit comprising:

a charging resistor coupled between the primary voltage source and a charge storage capacitor in the secondary voltage source;

a voltage divider having an input coupled to the junction of the charging resistor and the charge storage capacitor;

a semiconductor switching device coupled between an output of the voltage divider and an input of the inverter whereby the semiconductor switching device remains non-conductive and the inverter inoperative until the charge storage capacitor becomes charged so that the inverter is protected from transients related to the surge of charge necessarily delivered to the charge storage capacitor subsequent to the energization of the ballast system.

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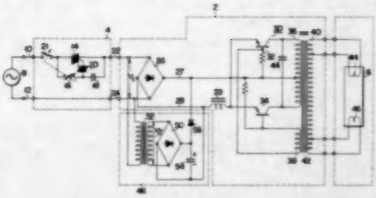
**4,392,086**

## APPARATUS FOR OPERATING A GASEOUS DISCHARGE LAMP

**Katsuyuki Ide; Kenpo Ohe, both of Yokohama, and Hisao Kobayashi, Fujisawa, all of Japan, assignors to Toshiba Electric Equipment Corporation, Tokyo, Japan**

**Filed Sep. 24, 1980, Ser. No. 190,269**
**Claims priority, application Japan, Sep. 28, 1979, 54/125666**
**Int. Cl.³ H05B *41/29, 41/36***
**U.S. Cl. 315—174** **6 Claims**



1. An apparatus for operating a fluorescent lamp comprising:

an AC power source for producing an AC voltage;

a power control means for controlling the phase angle of the AC voltage to generate a controlled output voltage during a power supply period in any half cycle of the AC voltage;

an auxiliary power source for generating an auxiliary volt-

age during at least a rest period between the power supply periods;

means for inverting the controlled output voltage and auxiliary voltage to a high frequency voltage; and

a fluorescent lamp having a filament, which is energized by the high frequency voltage wherein said auxiliary voltage supplied is of such a value that the output of said inverting means during said rest period is less than the discharge sustaining voltage of said fluorescent lamp and is sufficient to supply heating current to said filament.

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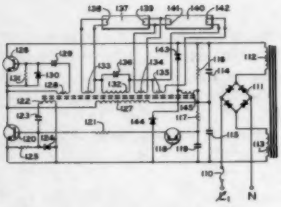
**4,392,087**

## TWO-WIRE ELECTRONIC DIMMING BALLAST FOR GASEOUS DISCHARGE LAMPS

**Zoltan Zansky, Roseville, Minn., assignor to Honeywell, Inc., Minneapolis, Minn.**

**Filed Nov. 26, 1980, Ser. No. 210,650**
**Int. Cl.³ H05B *41/29***
**U.S. Cl. 315—219** **29 Claims**



1. A two-wire electronic ballast arrangement for one or more gas discharge lamps dimming comprising:

a source of direct current;

a source of variable square wave electric power;

transistor inverter means adapted to be fed by said source of variable square wave electric power;

transformer means comprising

at least a first primary winding connected to said inverter and said source of direct current,

a first secondary winding for supplying power to one or more gas discharge lamps,

auxiliary secondary windings connected across the heating filaments of each gas discharge lamp,

said first and said auxiliary secondary windings being disposed in predetermined spaced relation to said primary winding and said auxiliary secondary windings being disposed in predetermined spaced relation to said first secondary winding such that the voltage supplied to the heating filaments of said one or more gas discharge lamps remain substantially constant during variation of the voltage to said primary;

tuning capacitor means connected across said first secondary winding selected to be in resonance with the leakage inductance of said first secondary winding to produce tuned sinusoidal input to said one or more lamps.

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**4,392,088**

## DEVICE FOR CHARGING A CHARGING CAPACITOR

**Julius Hartai, Betzy Kjelsbergsvei 232c, 3000 Drammen, Norway**

**Filed Jan. 12, 1981, Ser. No. 224,020**
**Claims priority, application Norway, Jan. 11, 1980, 800064**
**Int. Cl.³ H05B *41/34***
**U.S. Cl. 315—241 R** **5 Claims**

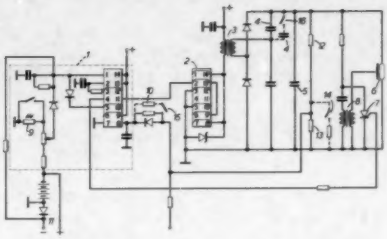
1. Apparatus for charging a charging capacitor, comprising

(a) a.c. power supply means including a d.c. source and an oscillator circuit connected with said d.c. source, said oscillator circuit comprising a multivibrator and having an a.c. output;

(b) first transformer means having a primary winding connected with the output of said oscillator circuit, and a secondary winding;

(c) a rectifier circuit connected in series with said secondary winding;

(d) auxiliary capacitor means connecting said secondary winding in series with the charging capacitor, whereby the charging capacitor is buffer charged in accordance with the capacity of said auxiliary capacitor means;



(e) a light source connected in parallel with the charging capacitor;

(f) a thyristor for controlling the discharge of the charging capacitor to cause said light source to flash, said thyristor being activated under control of said multivibrator; and

(g) resistor means for blocking said oscillator for a desired time after discharge of the charging capacitor.

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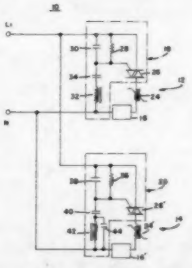
**4,392,089**

## ISOLATOR FOR USE WITH FREQUENCY RESPONSIVE SWITCHING CIRCUIT

**James N. Lester, Rockport, Mass., and Lee A. Prager, Raymond, Me., assignors to GTE Products Corporation, Stamford, Conn.**

**Filed Jul. 20, 1981, Ser. No. 285,205**
**Int. Cl.³ H04Q *1/45*; H05B *41/36***
**U.S. Cl. 315—313** **20 Claims**



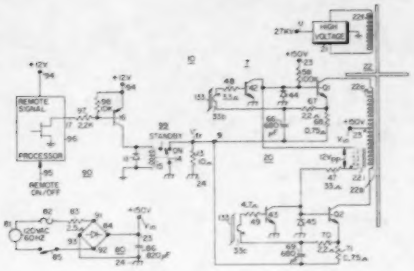
1. In a power control system comprising means for selectively generating a frequency control signal, at least one ballasted load, and frequency responsive switch means connected to respond to the frequency control signal by switching from a substantially non-conductive state to a substantially conductive state to enable the conduction of an AC power signal to the ballasted load, the improvement comprising:

an isolator connected in series relation with respect to the frequency responsive switch means and the ballasted load, which isolator comprises an inductor having high impedance, at least at the frequency of said control signal, below a saturation current for said inductor so as to sufficiently block any noise signals induced by said ballasted load which would otherwise cause undesired activation of said frequency responsive switch means.

## 4,392,090
## REMOTE RESPONSIVE TELEVISION RECEIVER FERRORESONANT POWER SUPPLY

James K. Rinehart; Donald H. Willis, and David W. Lux, all of Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.

Filed Nov. 16, 1981, Ser. No. 322,062
Int. Cl.³ H01J 29/70
U.S. Cl. 315—411 13 Claims



1. A television display system with a regulated power supply responsive to the state of a remote on/off command signal, comprising:

a source of first voltage;

a power oscillator coupled to said source for developing an alternating input voltage of a frequency determined by the frequency of operation of said oscillator, said oscillator including a frequency control terminal that controls the frequency of operation of said oscillator depending upon a control signal applied to said terminal;

means including a self-regulating circuit energized by said alternating input voltage for producing a regulated supply voltage;

a load circuit within said television display system energized by said regulated supply voltage; and

remote control means coupled to said oscillator frequency control terminal and responsive to said remote on/off command signal for applying thereto said control signal such that during the on-state of said command signal said oscillator operates at a frequency that permits normal ferroresonant operation of said self-regulating circuit and during the off-state of said command signal said oscillator operates at a different frequency that disables ferroresonant operation of said self-regulating circuit to thereby substantially deenergize said television display system load circuit.

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## 4,392,091
## VEHICLE PROPULSION CONTROL APPARATUS AND METHOD

Richard D. Roberts, South Park Township, Allegheny County, and Lester J. Hoffman, Churchill Borough, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 2, 1981, Ser. No. 298,693
Int. Cl.³ B61C 15/08
U.S. Cl. 318—52 11 Claims

1. In motor control apparatus for a vehicle operative with a track having an adhesion level and provided with a tractive effort request signal and having at least two wheel units, with a different one of a plurality of propulsion motors being coupled with each said wheel unit, the combination of:

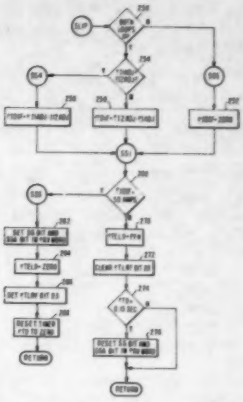
control means responsive to the tractive effort request signal for controlling the propulsion motors to

provide one operation of the wheel units,

means for establishing a first current of the motor coupled with a first of said wheel units,

means for establishing a second current of the motor coupled with the second of said wheel units, and

means for comparing said first and second currents to provide in response to a predetermined difference between the first and second currents a limit signal to control the



operation of said wheel units in relation to said adhesion level,

with said control means being responsive to said limit to decrease said tractive effort request such that the average motor current is decreased to provide another operation of the wheel units in accordance with said adhesion level.

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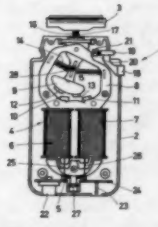
## 4,392,092
## OSCILLATING-ARMATURE MOTOR FOR ELECTRIC DRYSHAVERS AND THE LIKE

Gustav Gassner, Kelkheim, Fed. Rep. of Germany, assignor to Braun Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 959,188, Nov. 7, 1978, abandoned. This application Dec. 22, 1980, Ser. No. 219,384
Claims priority, application Fed. Rep. of Germany, Dec. 2, 1977, 2753749
Int. Cl.³ H02K 33/00
U.S. Cl. 318—127 3 Claims



1. A dryshaver, comprising a housing; a cutter block outwardly adjacent said housing and including a plurality of cutter blades; an electric motor mounted in said housing and comprising at least one respective electrical winding and having a pair of stator poles and at least one oscillatory armature carrying said cutter block and having a pair of armature poles; an electric current source for energizing said winding so that said armature is moved between one position in which the armature poles are closer to said stator poles and another position in which said armature poles are farther from the stator poles whereby said cutter block is moved by said arma-

ture between two positions; means for sensing each of said two positions of the cutter block and thus the positions of the armature relative to said stator, said position-sensing means being operative for generatiag a position signal, and a position-evaluating circuit means connected to said sensing means and to said source and responsive to said position signal, said position-evaluating circuit means being operative for effecting energization of said stator winding only when the armature poles are in said one position.

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**4,392,093**

**ELECTRONIC CONTROL AND REGULATING SYSTEM**

**Kurt Paule, Stuttgart; Fritz Schädlich; Martin Gerschner, both of Leinfelden-Echterdingen, and Friedrich Hornung, Stuttgart, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

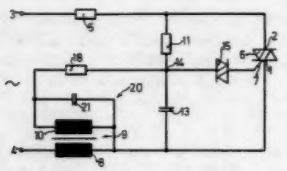
**PCT No. PCT/EP80/00038, § 371 Date Jun. 4, 1981, § 102(e) Date Jan. 27, 1981, PCT Pub. No. WO81/01085, PCT Pub. Date Apr. 16, 1981**

**PCT Filed Jun. 28, 1980, Ser. No. 233,587**

**Claims priority, application Fed. Rep. of Germany, Oct. 4, 1979, 2940195**

**Int. Cl.³ H02K *23/64***

**U.S. Cl. 318—245** **10 Claims**



1. Electronic control and regulating system for a universal motor (5) employing phase control, comprising

first and second input terminals (3, 4) connectable to a power grid supplying alternating current power at a predetermined power grid frequency;

a bilaterally conducting controlled semiconductor switch (6) having a control electrode (7), the main current carrying path of said switch being connected with the motor (5) for controlling current flow at predetermined phase positions through the motor;

a trigger circuit including a trigger capacitor (13) and a charge resistor (11; 40, 41) connected to the control electrode (7) of the semiconductor switch;

an inductive current/voltage converter (9) having a current coil (8) serially connected with the motor (5) and the main current carrying path of said semiconductor switch (6) and having a voltage coil (10) inductively coupled to the current coil;

a resonance circuit (20) including

a resonance capacitor (21) connected to the voltage coil (10) of the current/voltage converter which has a resonant frequency of between 0.5 to 0.1 times said predetermined power grid frequency;

and coupling/decoupling resistance means (14, 18; 30) connecting the resonance circuit to the trigger capacitor (13) and hence to the control electrode of the semiconductor switch to modify the charge on the trigger capacitor applied by the charge resistor (11; 40, 41) in dependence on the voltage of said resonance circuit and hence in dependence on load current, and hence modify the phase angle of triggering of the semiconductor switch in dependence on said load current.

**4,392,094**

**BRUSHLESS D-C MOTOR**

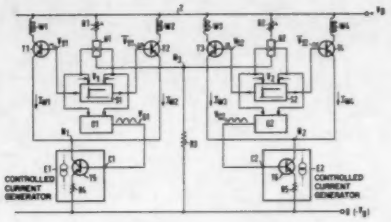
**Hans Kühnlein, Nuremberg-Grossgrundlach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Sep. 5, 1980, Ser. No. 184,468**

**Claims priority, application Fed. Rep. of Germany, Sep. 19, 1979, 2937866**

**Int. Cl.³ H02K *29/02***

**U.S. Cl. 318—254** **5 Claims**




1. A brushless D-C motor of the type having a permanently magnetized rotor which has alternatingly opposite magnetic poles at its circumference; a plurality of stator windings arranged 90° apart with respect to each other; first and second galvanomagnetic transducers disposed in the motor 90° apart from each other for producing first and second control signals, respectively, the control signals being responsive to the position of the rotor; a plurality of semiconductive switching devices connected in series with associated ones of the stator windings, each for controlling a respective stator winding current, the semiconductive switching devices having conductive and nonconductive states selectable in response to the polarity of the first and second control signals; the brushless D-C motor further comprising:

first and second controlled current generator means each for controlling current flowing through selected ones of the semiconductor switching devices which are associated with stator windings which are arranged 180° with respect to each other, each of said controlled current generator means having a control input for receiving a respective one of first and second input signals, and an output for conducting an output current proportional to said respective input signal; and

first and second coupling means each having an input for receiving a respective one of the control signals, and an output terminal connected to said control input of an associated one of said controlled current generator means for providing said respective input signal.

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**4,392,095**

**METHOD OF AND APPARATUS FOR GENERATING A UNIQUE INDEX MARK FROM THE COMMUTATION SIGNAL OF A D.C. BRUSHLESS MOTOR**

**David S. Ruxton, Bank Crescent, and Alex D. Stewart, Cardenden, both of Scotland, assignors to Rodine Limited, Glenrothes, Scotland**

**Filed Jun. 23, 1982, Ser. No. 391,010**

**Claims priority, application United Kingdom, Jun. 30, 1981, 8120092**

**Int. Cl.³ H02K *29/02***

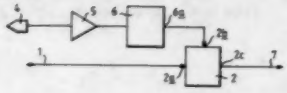
**U.S. Cl. 318—254** **4 Claims**

1. A method of generating a unique index mark from the commutation signal of a d.c. brushless motor characterised by,

sensing the commutation signal from the motor, dividing the frequency of the commutation signal to provide at least two index signals per revolution,

providing at least one track on the disk surface on which magnetic signals synchronised to one of the index signals are stored, said synchronising signals being stored on a

proportion of said at least one track, the other proportion of said at least one track being erased, said proportions being determined by the number of phases of the motor, and



sensing the synchronising signals on said at least one track and correlating the synchronising signals with one index signal to provide a unique index mark, the correlation providing the same unique index mark every revolution of the motor.

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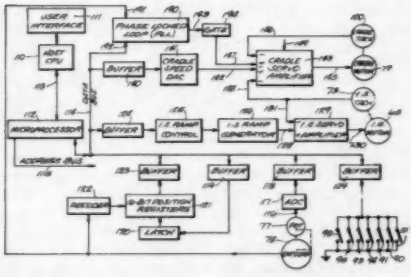
**4,392,096**

## SECTIONAL X-RAY TABLE HAVING DUAL SERVO DRIVES

**John P. Grajewski, Palmyra, Wis., and Robert J. Loyzim, Hiwassee, Va., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Oct. 15, 1981, Ser. No. 311,687**
**Int. Cl.³ G05B *11/32***
**U.S. Cl. 318—625** **7 Claims**



1. An X-ray table system comprising:

a base,

an elongated support means mounted to said base for moving longitudinally,

a reversible support means driving motor (support motor) and means for coupling the motor to the support means for moving said support means selectively between a retracted position and an advanced position and back to a retracted position, relative to the base,

elongated cradle means mounted to the support means for moving longitudinally relative to said support means,

a reversible cradle means driving motor (cradle motor) and means for coupling said motor to the cradle means for moving said cradle means selectively between a retracted position and an advanced position and back to a retracted position relative to said support means,

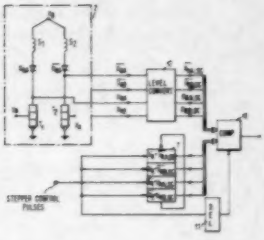
control means for said motors, said control means being operative to activate one of said motors to accelerate up to a constant speed and move the means to which it is coupled to a predetermined position corresponding to the beginning of a transition zone at said constant speed while the other of said motors is inactive, and said control means being operative to decelerate the one motor and accelerate the other motor correspondingly such that at the end of said transition zone said one motor is stopped and said other motor is running at constant speed for moving the means to which it is coupled at constant speed equal to the former speed of the other means.

**4,392,097**

## CIRCUIT ARRANGEMENT FOR THE CONTINUAL OPERATION MONITORING AND ERROR DIAGNOSIS OF A STEPPER MOTOR

**Jürgen B. Landrock, Ehningen; Manfred Perske, Sindelfingen, and Halim S. Tandjung, Gärtringen, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 3, 1980, Ser. No. 203,752**
**Claims priority, application Fed. Rep. of Germany, Nov. 10, 1979, 2945458**
**Int. Cl.³ H02K *29/04***
**U.S. Cl. 318—696** **11 Claims**



1. A process for the continual operation monitoring and error diagnosis of a stepper motor controllable at its windings by a control logic stage and driver stage using stepping pulses which are phase-shifted relative to each other, comprising the steps of;

forming signals representative of the respective logical values of said phase-shifted stepping pulses;

forming signals through level conversion having logical values representative of the respective switching states of said driver stage; and

comparing said signals representative of the respective logical values of said phase-shifted stepping pulses with said signals having logical values representative of the respective switching states of said driver stage whereby absence of comparison is indicative of error.

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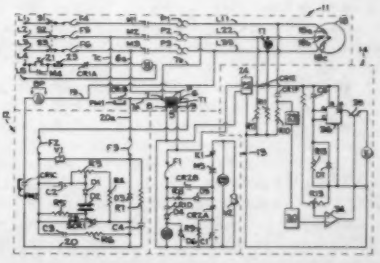
**4,392,098**

## RPM SENSOR FOR ELECTRONIC MOTOR BRAKING

**Young K. Min, Milwaukee, Wis., assignor to PT Components, Inc., Indianapolis, Ind.**

**Filed Oct. 16, 1981, Ser. No. 311,842**
**Int. Cl.³ H02P *3/24***
**U.S. Cl. 318—758** **9 Claims**



1. An RPM sensor for use with an AC induction motor having an electronic braking circuit and an electromechanical brake, said sensor causing said brake to engage said motor when the motor speed decreases to a predetermined value, said sensor comprising:

an electronic filter;

means for connecting said filter to a stator of said motor to obtain an electrical signal having a frequency proportional to the speed of said motor;

a frequency-to-voltage converter connected to said filter for developing an output voltage determined by said motor speed; and

means for using said converter output voltage to cause said brake to engage said motor when said output voltage reaches a predetermined value corresponding to a predetermined motor speed.

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**4,392,099**

**STARTING SYSTEM FOR BRUSHLESS MOTOR**

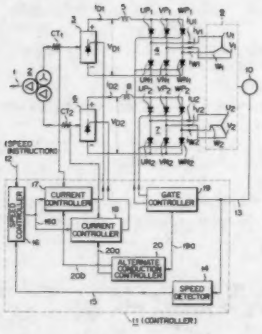
**Masateru Kuniyoshi, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Continuation of Ser. No. 119,520, Feb. 7, 1980, abandoned. This application Oct. 19, 1981, Ser. No. 312,901**

**Claims priority, application Japan, Feb. 20, 1979, 54-18727**

**Int. Cl.³ H02P** *1/26*

**U.S. Cl. 318—797** **5 Claims**




1. In a starting system of a brushless motor in a brushless motor apparatus comprising a first static commutation circuit including a first controllable thyristor rectifier, a first thyristor inverter and a first DC reactor inserted in a DC circuit between said first rectifier and first inverter; a second static commutation circuit including a second controllable thyristor rectifier, a second thyristor inverter and a second DC reactor inserted in a DC circuit between said second rectifier and said second inverter; a power source transformer for supplying three-phase AC voltage having a first phase to said first controllable thyristor rectifier and supplying three-phase AC voltage having a second phase 30 degrees out of phase with said first phase to said second controllable thyristor rectifier and a load including a brushless motor having a rotating motor receiving the outputs of said first and second thyristor inverters; wherein said starting system comprises means for causing one of said first and second static commutation circuits to conduct a DC current therethrough and causing the other one of said first and second static commutation circuits conducting a DC current therethrough to be concurrently substantially cut off, for every 30° electrical angle of rotation of the rotor of said brushless motor at the time of starting said brushless motor.

**4,392,100**

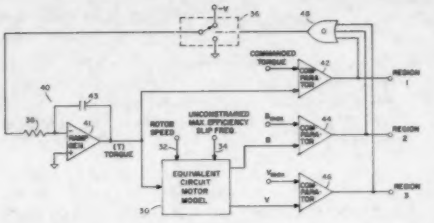
**OPTIMUM EFFICIENCY CONTROL SYSTEM**

**William F. Stanton, Newton; David B. Eisenhaure, Hull, and Robert D. Drescher, Cambridge, all of Mass., assignors to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.**

**Filed Aug. 1, 1980, Ser. No. 174,552**

**Int. Cl.³ H02P** *5/40*

**U.S. Cl. 318—803** **3 Claims**




1. An optimum efficiency control system for a variable torque/speed rotary a.c. induction machine comprising:

means for indicating a first fixed slip region in response to the torque exceeding commanded torque;

means for indicating a second flux saturation region in response to the flux exceeding the saturation flux;

means for indicating a third voltage saturation region in response to the voltage exceeding the saturation voltage;

means, responsive to said means for indicating said first fixed slip region, for commanding an excitation frequency as a function of the rotor speed and unconstrained maximum efficiency slip and for commanding an excitation voltage/current as a function of the actual torque/speed and commanded torque/speed; responsive to said means for indicating said second flux saturation region, for commanding an excitation frequency as a function of the rotor speed and slip frequency, and for commanding an excitation voltage/current as a function of the actual flux and the saturation flux; and response to said means for indicating said third voltage saturation region for commanding a saturation voltage as a function of rotor speed and for commanding excitation frequency as a function of slip frequency; and

means responsive to said means for commanding, for varying the frequency and magnitude of the excitation voltage/current supplied to the machine in the three regions of operation.

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**4,392,101**

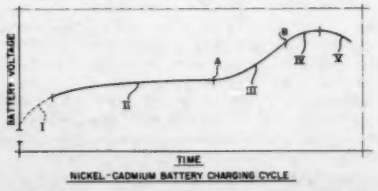
**METHOD OF CHARGING BATTERIES AND APPARATUS THEREFOR**

**David A. Saar, Timonium, and Richard T. Walter, Baltimore, both of Md., assignors to Black & Decker Inc., Newark, Del.**

**Continuation of Ser. No. 911,554, May 31, 1978, abandoned. This application Jan. 5, 1982, Ser. No. 337,174**

**Int. Cl.³ H01M** *10/44*

**U.S. Cl. 320—20** **64 Claims**




1. A method of rapidly and efficiently charging a battery of the type having characteristic associated therewith that varies

with the state of charge of the battery and in which the characteristic varies with time during charging to exhibit a plurality of inflection points prior to the battery attaining substantial full charge, the method comprising the steps of:

supplying electrical energy to the battery for charging thereof;

monitoring said characteristic drawn by the battery during charging;

analyzing the variation of said monitored characteristic with time to determine the occurrence of the last inflection point exhibited prior to the battery attaining substantial full charge; and

controlling the supply of electrical energy of the battery on the basis of the so-determined occurrence.

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**4,392,102**

## LIQUID CRYSTAL INDICATOR

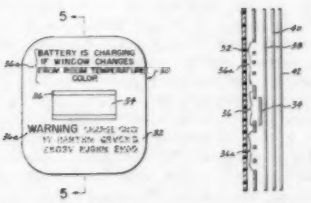
**Raymond K. Sugalski, and Charles R. Blake, both of Gainesville, Fla., assignors to General Electric Company, Gainesville, Fla.**

**Continuation of Ser. No. 939,356, Sep. 5, 1978, abandoned, which is a continuation-in-part of Ser. No. 910,517, May 30, 1978, Pat. No. 4,173,733, which is a continuation of Ser. No. 793,012, May 2, 1977, abandoned. This application Apr. 28, 1981, Ser. No. 258,532**

**The portion of the term of this patent subsequent to Nov. 6, 1996, has been disclaimed.**

**Int. Cl.³ H02J** *7/00*

**U.S. Cl. 320—48** **9 Claims**




1. A liquid crystal indicator for indicating the flow of current through battery cells in a battery charger for charging, which includes a liquid crystal indicator label comprising:

a substantially transparent substrate having a front surface adapted to provide an exterior surface of said indicator and a back surface on the opposite side thereof;

a liquid crystal material adhered to a predetermined portion of said back surface of said substrate, said predetermined portion being less than the surface area of said back surface, said liquid crystal material being adapted to change color in response to changes in temperature within a predetermined range;

a black background layer adhered at least behind said liquid crystal material within the predetermined portion of said substrate; and

means for attaching the indicator to a desired structure,

said liquid crystal indicator label being mounted to the casing of the battery charger substantially directly adjacent heat generating circuit means associated with each battery cell in the battery charger such that said liquid crystal indicator label changes color when charging current flows through said heat generating circuit means to indicate that the associated battery cell is being charged.

**4,392,103**

## CURRENT SENSING REGULATOR

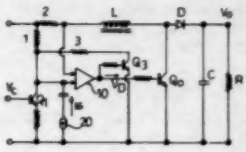
**Dermot O'Sullivan, Leiderdorp, and Alan Weinberg, Sassenheim, both of Netherlands, assignors to Organisation Europeenne de Recherches Spatiales, Paris, France**

**Filed Jun. 8, 1981, Ser. No. 271,217**

**Claims priority, application Belgium, Jun. 10, 1980, 200973**

**Int. Cl.³ H02P** *13/32*

**U.S. Cl. 323—222** **6 Claims**




1. In an apparatus for the control of an operating parameter of an installation, said parameter being related to an electric current feeding a regulation unit including a regulating switch arranged for being switched between a first non-conducting logic state and a second conducting logic state in response to a drive signal, an electric controller operating in conductance control mode, comprising:

current reference signal generator means connected to be responsive to a command signal for generating a current reference signal the amplitude of which is a function of said command signal, said current reference signal having a upper control lever and a lower control level;

current sensor means connected to sense said electric current and to generate a sensing signal representing said current;

comparator means connected to compare said current sensing signal to said current reference signal for producing said drive signal for the regulating switch, said comparator means being further connected to a synchronization source for accepting synchronization pulses to switch said drive signal having a first state when the increasing sensing signal is equal to or greater than the lower control level of the current reference signal and having a second state when the decreasing current sensing signal is equal to or lower than the upper control level of the current reference signal.

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**4,392,104**

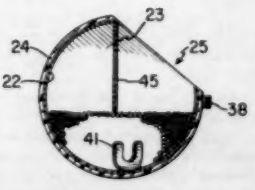
## DIELECTRIC TEST UNIT

**James C. Lewis; Jerry W. Miller, both of Abbeville; Clyde D. Simpson, Calhoun Falls, and Ronald G. Thomasson, Abbeville, all of S.C., assignors to Automation Industries, Inc., Greenwich, Conn.**

**Filed Jul. 10, 1980, Ser. No. 168,437**

**Int. Cl.³ G01R** *31/12*

**U.S. Cl. 324—54** **12 Claims**




1. Apparatus for testing the dielectric integrity of an electrically insulated conductor comprising

(a) a receptacle formed with an opening and having an axis of rotation,
(b) means for rotating the receptacle about said axis between first and second positions,
(c) support means within the receptacle for receiving the insulated conductor through the opening,
(d) a flowable mass of electrically conductive beads within the receptacle to a level such that in the first position the insulated conductor held by the support means is above the bead mass but in the second position said conductor is immersed with the bead mass, and
(e) circuit means for establishing a voltage potential between the conductor and mass of beads and for sensing any electrical current flowing therebetween.

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**4,392,105**

## TEST CIRCUIT FOR DELAY MEASUREMENTS ON A LSI CHIP

**Mark H. McLeod, Poughkeepsie, N.Y., assignor to International Business Machines Corp., Armonk, N.Y.**

**Filed Dec. 17, 1980, Ser. No. 217,373**
**Int. Cl.³ G01R** *17/02, 29/02, 31/28*
**U.S. Cl. 324—57 DE** **6 Claims**

1. For use on an LSI chip, a circuit for measuring the turn-on and turn-off delays of a logic circuit on said chip, said measuring circuit comprising:
a first loop capable of producing a first signal, and containing said logic circuit;
a second loop capable of producing a second signal, and not containing said logic circuit; and
means for insuring that a first portion of each of said first and second signals are related to each other in a manner that is dependent upon the turn-on delay of said logic circuit, and that a second portion of each of said first and second signals are related to each other in a manner that is dependent upon the turn-off delay of said logic circuit.

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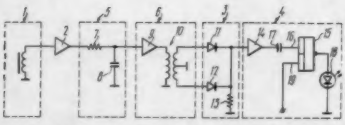
**4,392,106**

## NON-CONTACT DEVICE FOR MONITORING ELECTRICAL PULSE SIGNALS

**Nikolai I. Yakovlev, ulitsa O. Forsh, 3, kv. 101; Anatoly T. Smolin, Grazhdansky prospekt, 19, korpus 1, kv. 1; Vasily G. Kokovikhin, ulitsa Vernosti, 33, korpus 1, kv. 53, and Alexei A. Kotunov, ulitsa 3 Internatsionala, 57, kv. 46, all of Leningrad, U.S.S.R.**

**Filed Jan. 7, 1981, Ser. No. 223,047**
**Int. Cl.³ G01R** *31/02*
**U.S. Cl. 324—72.5** **2 Claims**



1. A non-contact device for monitoring electrical pulse signals comprising:
a sensing means responsive to variation with time of the electromagnetic field produced by the monitored pulse signal;
an amplifier connected to said sensing means and having an output;
a rectifier having an input and output;
a network including an integrator circuit and a differentiating circuit connected in series, said network having an input connected to said output of said amplifier and an output connected to said input of said rectifier; and
an indicator unit having an input connected to said output of said rectifier.

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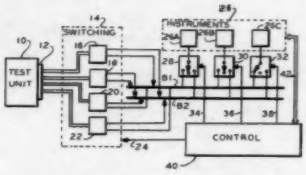
**4,392,107**

## SWITCHING EQUIPMENT FOR TESTING APPARATUS

**Bernard P. Gollomp, Far Rockaway, N.Y., assignor to The Bendix Corporation, Teterboro, N.J.**

**Filed Sep. 9, 1980, Ser. No. 185,452**
**Int. Cl.³ G01R** *15/12*
**U.S. Cl. 324—73 R** **11 Claims**




1. In a testing apparatus for measuring with a plurality of instruments the response of a unit under test, which unit has a plurality of test terminals, switching equipment comprising:
a common signal bus;
a plurality of switching networks, each having at least two active states, in each of its active states said switching networks being operable to connect at least one of said plurality of test terminals to said bus, each of said networks having a selection input operable to select its states;
a plurality of switching couplers each having a control terminal and each having a switched input connected to a different corresponding one of said instruments, each of said couplers being operable by its control terminal to connect and disconnect its corresponding one of said instruments to said common signal bus; and
control means connected to each of said switching networks and couplers for providing a separate signal to each selection input and each control terminal, said control means being operable for each of said test terminals to connect it to at least one of said instruments through one of said switching networks, said bus and one of said switching couplers, said control means being operable to substitute one of said instruments for another so that said common bus can be time shared.

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**4,392,108**

## BROADBAND RADIATION DETECTOR FOR MICROWAVE AND LOWER FREQUENCIES

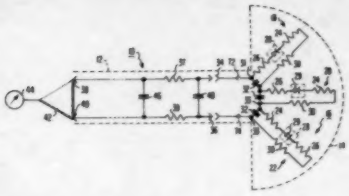
**Samuel Hopfer, Brooklyn, N.Y., assignor to General Microwave Corporation, Farmingdale, N.Y.**

**Continuation-in-part of Ser. No. 883,632, Mar. 6, 1978, Pat. No. 4,207,518. This application Apr. 24, 1980, Ser. No. 143,365**
**Int. Cl.³ G01R** *21/10, 19/22*
**U.S. Cl. 324—95** **6 Claims**

1. A monitor for detecting free-space radiation at radio frequencies in a broad band of microwave frequencies and in a broad band of lower frequencies; said monitor comprising:
a resistive strip having a d-c resistance that is substantially uniform over said radiation frequency range and larger than the characteristic impedance of free space for interacting with free-space radiation to have r-f currents induced therein in accordance with particular levels of the intensity of said free-space radiation, said r-f currents for corresponding radiation intensity levels in said band of microwave frequencies being substantially constant in

amplitude with frequency, and said strip having in said microwave band a reactance small relative to said d-c resistance;

said strip being characterized by interacting with free-space radiation in said lower frequency band to produce for corresponding levels of radiation r-f currents of generally varying amplitude over said lower frequency band, and having in said lower band a reactance substantial in magnitude relative to said resistance;



a monitoring circuit including a barrier layer device having a substantial reactance in series with said resistive strip for converting r-f currents induced in said strip by free-space radiation to corresponding d-c signals, said monitoring circuit having means for presenting a resistance in shunt with the reactance of said barrier layer device, and means for presenting in shunt with the reactance of said barrier layer device small and substantial reactance values, respectively, in said microwave and lower frequency bands, and for varying in reactance with said strip reactance in said lower frequency band.

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**4,392,109**

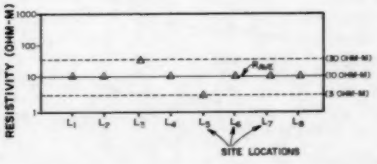
## STATIC CORRECTION FOR MAGNETOTELLURIC DATA

**Barry N. Warner, Duncanville, Tex., assignor to Mobil Oil Corporation, New York, N.Y.**

**Filed Nov. 14, 1980, Ser. No. 206,920**

**Int. Cl.³ G01V 3/38**

**U.S. Cl. 324—350** **2 Claims**




1. A method for correcting near surface resistive anomalies in magnetotelluric surveys comprising the steps of:

receiving magnetotelluric survey data curves;

selecting a portion of each curve;

computing an average for said portion of each curve;

determining a mean value and variance limit for said averages;

selecting all curves having said average portion exceeding said variance limit;

multiplying said selected curves by a ratio of said average of each curve and said mean value to correct said selected curves; and

displaying said corrected curves and said curves having said average portion within said variance limit.

**4,392,110**

## METHODS AND APPARATUS FOR MONITORING THE CONDITION OF DIELECTRIC LIQUID IN ELECTRIC DISCHARGE MACHINING

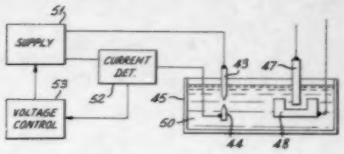
**Mohamed F. El-Menshawy, Birmingham; Peter A. Woodrow, Sevenoaks, and Sushantha K. Bhattacharyya, Birmingham, all of England, assignors to National Research Development Corporation, London, England**

**Filed Jun. 12, 1980, Ser. No. 158,813**

**Claims priority, application United Kingdom, Jun. 12, 1979, 7920444**

**Int. Cl.³ G01N 27/60**

**U.S. Cl. 324—453** **15 Claims**




1. A method of monitoring the condition of dielectric liquid being used in an electrical discharge machining process, comprising:

causing at least a portion of the dielectric liquid used in an electrical discharge machining process to flow in contact with two adjacent but separated electrodes, and

at least from time to time, deriving a signal representative of change in at least one component of the impedance across the electrodes due to change in condition of said liquid.

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**4,392,111**

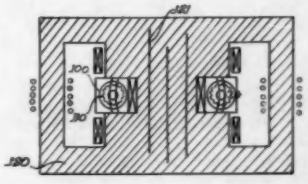
## METHOD AND APPARATUS FOR ACCELERATING CHARGED PARTICLES

**Norman Rostoker, Irvine, Calif., assignor to Maxwell Laboratories, Inc., San Diego, Calif.**

**Filed Oct. 9, 1980, Ser. No. 195,521**

**Int. Cl.³ H05H 7/00, 11/00**

**U.S. Cl. 328—237** **18 Claims**




7. A device for accelerating charged particles, each having predetermined charge e and predetermined mass m, to ultra-relativistic energies along a path characterized by a radius R which may be infinite, comprising

means defining an evacuated containment region encompassing the path;

means for providing a magnetic field having field lines substantially parallel to the path direction;

means for introducing the charged particles having predetermined charges at low energy $(\frac{1}{2})mV^2$, V being the average velocity of the particles perpendicular to the path, into the evacuated containment region;

means for increasing the intensity of the magnetic field during and after the time the charged particles are introduced into the containment region so as to compress the charged particles in the containment region in the direction transverse to the path direction to a density n substantially contained in a region along the path characterized

by an average radius a, the density n being approximately related to a beam blow-up time $t_b$ in the absence of the magnetic field by the formula

$$(ct_b)^2=2\pi/nr_e,$$

c being the velocity of light and $r_e$ the classical electron radius, the density n corresponding to a line density N satisfying the inequality

$$N>\frac{1}{2}(a/R)(mV^2)/e^2;$$

and

means for accelerating the charged particles to ultra-relativistic energies more than about 100 Mev to form a beam along the path while the loss of charged particles from the beam occasioned by space charge effects is inhibited, the time $t_b$ being substantially less than the time required to accelerate the charged particles to ultra-relativistic energies,

the magnetic field parallel to the path direction inhibiting the loss of charged particles from the beam due to space charge effects acting prior to acceleration to ultra-relativistic energies.

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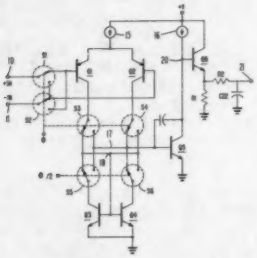
**4,392,112**

## LOW DRIFT AMPLIFIER

**Otto H. Schade, Jr., North Caldwell, N.J., assignor to RCA Corporation, New York, N.Y.**

**Filed Sep. 8, 1981, Ser. No. 300,121**
**Int. Cl.³ H03F 3/45, 1/02**
**U.S. Cl. 330—252** **7 Claims**



1. A differential amplifier circuit comprising;

inverting and non-inverting input terminals and an output terminal;

a differential transistor pair having first and second input terminals and first and second output terminals;

first and second load means;

first means for alternately connecting said first load means to said first and second output terminals of the differential transistor pair and concurrently alternately connecting said second load means to said second and first output terminals of the differential transistor pair at a first cyclic rate, said first and second load means and said differential transistor pair thereby forming a differential amplifier stage, the load presented to each output terminal of the differential pair being the time average of the first and second load means;

second means for alternately connecting said inverting input terminal to the first and second input terminals of the differential pair and concurrently alternately connecting the non-inverting input terminal to the second and first input terminals of the differential pair at a second cyclic rate; and

third means alternately connecting the first and second output terminals of said differential transistor pair to said output terminal at said second cyclic rate, the alternate connection of input terminals, output terminals and load means tending to average out offsets in the circuitry and thereby reducing DC input offset and drift.

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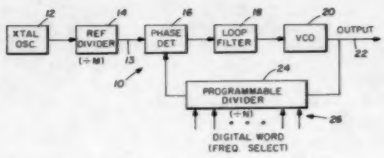
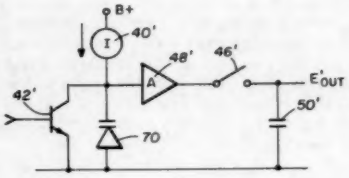
**4,392,113**

## PHASE-LOCKED LOOP INCLUDING NON-LINEAR PHASE DETECTOR OF THE SAMPLE AND HOLD TYPE

**Charles R. Jackson, 1200 - 69th St. N., St. Petersburg, Fla. 22519**

**Filed Feb. 12, 1981, Ser. No. 233,904**
**Int. Cl.³ H03L 7/08**
**U.S. Cl. 331—14** **4 Claims**




1. Apparatus for automatically compensating for non-linear variations in the gain characteristics of a multi-channel, single loop synthesized frequency generator which occur during tuning from a first frequency channel having a frequency, $f_1$, to a second frequency channel having a frequency, $f_2$, comprising:

a voltage controlled oscillator (VCO) incorporating a Varactor tuned resonant circuit and having an input and an output;

a sample-hold phase detector circuit having an output connected to the input of said VCO;

a feed back loop conductor interconnecting the output of said VCO to said phase detector to form a phase locked loop frequency generator, and

gain compensation means interconnected in said phase detector and responsive to the first channel frequency, $f_1$, and the second channel frequency, $f_2$, for reducing non-linear variations in loop gain to 0 db when tuning the frequency generator from $f_1$ to $f_2$.

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**4,392,114**

## AUDIO DEVICE HAVING A TONE CONTROL CANCELLING CIRCUIT

**Shigeru Yamada, and Kazuya Ohhara, both of Toda, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan**

**Filed May 15, 1981, Ser. No. 263,837**
**Claims priority, application Japan, May 21, 1980, 55-66396**
**Int. Cl.³ H03H 7/01**
**U.S. Cl. 333—28 T** **5 Claims**

1. An audio device comprising:

an equalizer means;

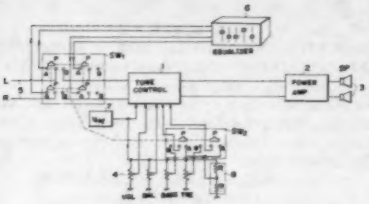
a tone control means having at least bass and treble regulating means;

an amplifier supplied with outputs from said tone control means;

a reference control means;

a first switch for applying input signals directly or through said equalizer means to said tone control means;

a second switch which connects said bass and treble regulating means to said tone control means when said input signals are directly applied to said tone control means and



disconnects said bass and treble regulating means from said tone control means when said input signals are applied to said tone control means through said equalizer means to thereby connect said reference control means to said tone control means.

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**4,392,115**

## VOLUME MAGNETOSTATIC WAVE DEVICE

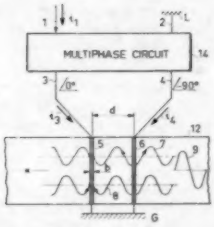
**Gerard Volluet, and Pierre Hartemann, both of Paris, France, assignors to Thomson-CSF, Paris, France**

**Filed Apr. 13, 1981, Ser. No. 253,268**

**Claims priority, application France, Apr. 14, 1980, 80 08279**

**Int. Cl.³ H03H *9/125, 9/38;* H03B *5/00***

**U.S. Cl. 333—141** **10 Claims**




1. A volume magnetostatic wave device for operating at a predetermined wavelength provided with at least one microstrip transducer at the surface of a wafer of ferrimagnetic material, wherein said transducer comprises at least one pair of filament-type conductive elements spaced at a predetermined interval from each other and having the same length, the terminals of said transducer being connected electrically to the conductive elements through a polyphase transformer circuit, the currents which flow through said conductive elements being equal and in phase quadrature so that the waves produced by said currents add to each other in one direction and cancel each other in the other direction.

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**4,392,116**

## TRIPLE TRANSIT CANCELLATION

**Adrian J. De Vries, Mount Prospect, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.**

**Filed Oct. 14, 1980, Ser. No. 196,247**

**Int. Cl.³ H03H *9/64, 9/42***

**U.S. Cl. 333—194** **10 Claims**

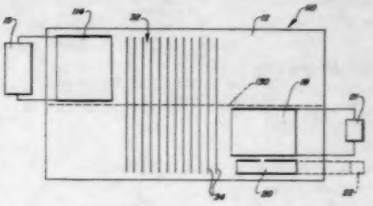
3. A surface acoustic device comprising:

a substrate with at least four laterally separated tracks;

means acoustically coupling said tracks;

primary input surface acoustic transducer means on a first one of said tracks for generating an acoustic wave, for receiving a first reflection thereof, and for contributing to a second reflection thereof;

dummy input surface acoustic transducer means on a second one of said tracks for also receiving said first reflection and also contributing to said second reflection;



primary output surface acoustic transducer means on a third one of said tracks for receiving said acoustic wave, for contributing to said first reflection thereof, and for receiving said second reflection thereof;

and dummy output surface acoustic transducer means on a fourth one of said tracks for also receiving said acoustic wave and also contributing to said first reflection thereof.

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**4,392,117**

## SWITCHING MAGNET

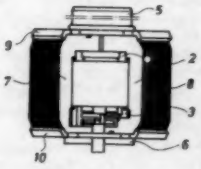
**Christoph Gibas, Neunkirchener Weg 5, 5908 Neunkirchen, and Michael Müller, Zum Turm 1, 6683 Spiesen, Elversberg, both of Fed. Rep. of Germany**

**Filed Jul. 8, 1981, Ser. No. 281,387**

**Claims priority, application Fed. Rep. of Germany, Jul. 15, 1980, 3026725**

**Int. Cl.³ H01F *3/00***

**U.S. Cl. 335—297** **4 Claims**



1. An improved switching magnet structure of the type including a yoke, an armature and a coil spool having a hollow cylindrical portion, spaced flange members on the cylindrical portion and a coil wound around the cylindrical portion, wherein the improvement comprises

a plurality of U-shaped laminations arranged in bundles, each said lamination having two legs and an interconnecting portion, the outer corner at the junction of each leg with the interconnecting portion being beveled at an acute angle relative to the leg;

means defining guide slots formed on the outwardly facing surfaces of the flange members for receiving the leg portions of bundles of said laminations to form a yoke, said slots being axially aligned with each other at opposite ends of said spool; and

first and second cover plates spaced apart in substantially parallel relationship with each other and with the flange members and engaging the bundles of laminations forming said yoke,

each said cover plate having contact surfaces positioned to engage said beveled portions of said laminations in

said bundles to restrain said bundles against radial outward movement relative to said core spool.

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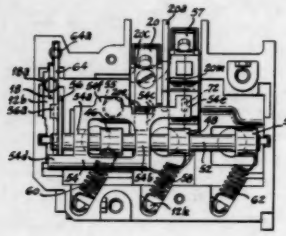
**4,392,118**

## THERMAL OVERLOAD RELAY HAVING A N.O. OR N.C. CONTACT UNIT SELECTIVELY ADDABLE IN THE FIELD

**Arthur F. Kolb; Arthur J. Franklin, both of Bowling Green, and Toby I. Miller, Rockfield, all of Ky., assignors to Eaton Corporation, Cleveland, Ohio**

**Filed Mar. 2, 1982, Ser. No. 354,121**
**Int. Cl.³ H01H *71/20, 73/22***
**U.S. Cl. 337—154** **10 Claims**



1. An overload relay for an electrical power supply circuit comprising in combination;

a relay housing;

a standard switch mounted in said housing and being operable to open in response to an overload current condition to protect said circuit;

a rotatable shaft;

a latched trip lever mounted on said shaft operable upon release to rotate said shaft in a first direction;

means biasing said latched trip lever for rotation in said first direction;

an overload current responsive element having means normally latching said trip lever against rotation and comprising means responsive to an overload current in said circuit for tripping said latch to allow said biasing means to rotate said trip lever and said shaft in said first direction;

a switch operating lever freely rotatably mounted on said shaft and having a finger for operating said standard switch;

means normally biasing said switch operating lever in one rotary direction to cause said finger to hold said standard switch normally closed;

a reset member non-rotatably mounted on said shaft and engaging said switch operating lever to drive the latter in the other rotary direction against the force of its said biasing means when said shaft is rotated in said first direction in response to said overload trip thereby to release said standard switch to allow it to reopen;

a slot in said housing for receiving an auxiliary switch;

an auxiliary switch insertable into said slot and removable therefrom without disassembling said relay;

means to mount said auxiliary switch in said housing slot;

an arm on said switch operating lever for actuating said auxiliary switch at the end of the trip stroke whereby the force required at the beginning of the trip stroke is reduced;

and said auxiliary switch comprising a switch housing enclosing first and second spaced-apart resilient contact strips and a contact actuator, said contact actuator having an aperture through which one of said contact strips extends, and a selected one of two interchangeable contact bias springs, one spring being placed within said aperture below said one contact strip and the bottom of said aperture to provide a normally open switch, and the other spring being alternatively placed between the other contact strip and said switch housing in compression to provide a normally closed switch, and contacts at corresponding ends of said contacts strips being subjected to wiping action upon closing and opening when said contact actuator is actuated by said arm;

and means for resetting said relay.

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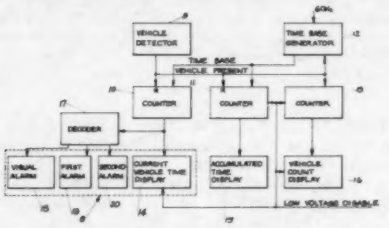
**4,392,119**

## APPARATUS AND METHOD FOR MONITORING THE ARRIVAL AND DURATION OF STAY OF A VEHICLE AT A DRIVE-IN WINDOW

**Ronn Price, West Chester; Gary Brown, Springboro; Andrew A. Muraski, Middletown, all of Ohio, and William C. Muraski, Olathe, Kans., assignors to U.S. Computer Systems, Inc., Cincinnati, Ohio**

**Filed Jun. 15, 1981, Ser. No. 273,645**
**Int. Cl.³ G08B *21/00***
**U.S. Cl. 340—38 L** **61 Claims**




1. Apparatus for monitoring the arrival and duration of stay of a motor vehicle at a transaction station associated with a drive-in business or the like of the type having a building structure including a vertical wall mounting a drive-in window, and a vehicle approach lane positioned alongside the building structure wall, said apparatus comprising:

monitor means producing an electrical signal upon the arrival of a motor vehicle at the transaction station;

means responsive to said electrical signal for timing a duration of stay commencing with the arrival of the vehicle at the transaction station; and

means responsive to said timing means for providing a visually sensible display of said duration of stay.

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**4,392,120**

## PATTERN INSPECTION SYSTEM

**Kikuo Mita; Masayuki Oyama, both of Yokohama; Takashi Yoshida, Kawasaki; Masato Nakashima; Katsumi Fujihara, both of Yokohama, and Tadao Nakakuki, Kawasaki, all of Japan, assignors to A. Aoki & Associates, Tokyo, Japan**

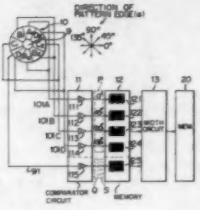
**PCT No. PCT/JP79/00271, § 371 Date Jun. 30, 1980, § 102(e) Date Jun. 23, 1980, PCT Pub. No. WO80/01002, PCT Pub. Date May 15, 1980**
**PCT Filed Oct. 25, 1979, Ser. No. 197,345**
**Claims priority, application Japan, Oct. 30, 1978, 53-133610; Nov. 13, 1978, 53-155946[U]; Nov. 28, 1978, 53-146865; Nov. 28, 1978, 53-146870**
**Int. Cl.³ G06K *9/00;* G01B *11/02***
**U.S. Cl. 382—22** **13 Claims**

1. A pattern inspection system for inspecting a pattern formed on a base, the pattern having a body and edges, said inspection system obtaining information regarding the light transmission or lack of light transmission through the pattern by scanning the pattern with a light beam, said inspection system comprising:

detection means, including means for separately detecting the body of the pattern and generating body signals representing the body of the pattern and means for separately detecting the pattern edges and the angle of the edges with

respect to a predetermined line and generating edge signals representing the edge of the pattern;

first memory means having a plurality of memory units, operatively connected to said pattern body detection means and said edge detection means, for separately storing the body signals and the edge signals in separate memory units of said first memory means, wherein a first of the plurality of the memory units stores the body signals,



wherein the remaining units of the plurality of memory units store the edge signals, wherein each of the remaining units represents the angle of the edge signals stored therein; and

width measuring means, operatively connected to said first memory means, for measuring the width of the body of the pattern between two edges of the pattern by summing the body signals between the two edges of the pattern.

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**4,392,121**

## RECEIVER FOR A.C. ELECTRICAL SUPPLY SIGNALLING ARRANGEMENT

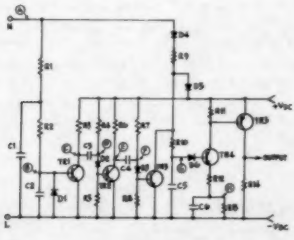
**Frederick M. Gray, Stafford, and Charles G. Leedham, Doveridge, both of England, assignors to The General Electric Company Limited, London, England**

**Filed Dec. 2, 1980, Ser. No. 212,209**

**Claims priority, application United Kingdom, Dec. 7, 1979, 7942399**

**Int. Cl.³ H04B 3/54**

**U.S. Cl. 340—310 A** **8 Claims**



1. A receiver for use in an a.c. electrical supply signalling arrangement of the kind wherein information is conveyed as a pattern of time-spaced voltage reductions impressed on the a.c. supply voltage waveform, each reduction being for a fraction of a cycle of the waveform including a voltage zero crossing, the receiver comprising means for detecting the presence of an impressed voltage reduction by comparing the integral of the supply voltage waveform over a period extending over a small fraction of a cycle ending not later than the voltage zero crossing included in that voltage reduction with the integral over a corresponding period when no voltage reduction is present.

**4,392,122**

## MAGNETICALLY TRIGGERED ON-BOARD ELAPSED TIME INDICATOR

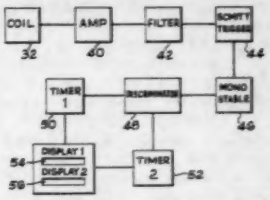
**Redvers A. Hocken, 1195 Pershore Rd., Stirchley, Birmingham, England**

**Filed Jun. 25, 1981, Ser. No. 277,399**

**Claims priority, application United Kingdom, Jun. 26, 1980, 8020899; Apr. 29, 1981, 8113188**

**Int. Cl.³ G08B 21/00**

**U.S. Cl. 340—323 R** **17 Claims**




1. A system for on-board timing for a vehicle traversing a predetermined course, said system comprising sensing coil means adapted to be carried by the vehicle for producing an electrical signal in response to sensing at least one magnet located at at least one predetermined position along said course, on-board timing means and on-board control means responsive to said sensing coil means for controlling operation of the timing means to provide a record of the time interval elapsing between successive or selected electrical signals produced by said sensing coil means.

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**4,392,123**

## SIGNAL-TO-NOISE IMPROVING SYSTEM

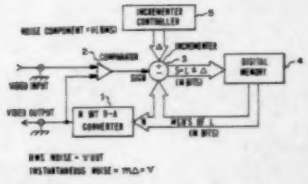
**Harro Brüggemann, Mount Waverley, Australia, assignor to The Dindima Group Pty. Ltd., Ringwood, Australia**

**Filed May 19, 1981, Ser. No. 265,114**

**Claims priority, application Australia, Jun. 2, 1980, PE3840; Dec. 9, 1980, PE6849; Feb. 25, 1981, PE7735**

**Int. Cl.³ H03K 13/02**

**U.S. Cl. 340—347 AD** **5 Claims**




1. A signal-to-noise improving system comprising, a circuit input for incoming noisy analogue signals and a circuit input for digitally stored input signals which have an improved signal-to-noise ratio provided by the system and which have been converted to analogue form,

said circuit input and said circuit output being connected to inputs of an analogue comparator arranged to give an output signal which signifies that the analogue form of the digitally stored input signal is either higher or lower in magnitude than the incoming noisy analogue signal or that the incoming noisy analogue signal is either higher or lower in magnitude than the analogue form of the digitally stored input signal,

said comparator output signal being connected to a signal incrementor to give a signal output which is the digitally stored input signal incremented higher or lower by a number digitally in response to either a higher or lower signal output from said comparator, said incrementor

including a controller for controlling the incrementation of said incrementor according to a predetermined sequence based on a prior knowledge of the input noise level such that upon commencement of said incrementation, the magnitude of incrementation will be approximately equal to $\sqrt{2/\pi}$ times the root mean square of the input noise level and said magnitude of incrementation will be divided by two for each $2^N$ incrementations of a digitally stored input signal where N=0, 1, 2, 3, 4, 5, . . . ,

a store for storing in digital form the so incremented digitally stored input signals, the store output being connected to a digital-to-analogue converter the output of which is connected to said circuit output,

said comparator, said incrementor, said store and said digital-to-analogue converter being operative cyclically to compare the incoming noisy analogue signals with the analogue form of the digitally stored input signals and to update the digitally stored input signals by adding or subtracting a number digitally from the digitally stored input signals in accordance with the output signal of said comparator whereby to eventually store signals representative of the incoming signals with enhanced signal-to-noise ratio so that said circuit output can provide an output signal of those enhanced digitally stored input signals.

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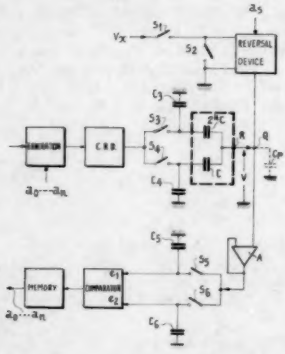
**4,392,124**

## ANALOG-DIGITAL CODER COMPRISING A CHARGE TRANSFER CODED VOLTAGE GENERATION

**Roger Benoit-Gonin; Jean L. Berger, and Jean L. Coutures, all of Paris, France, assignors to Thomson - CSF, Paris, France**

**Filed Apr. 21, 1981, Ser. No. 256,051**
**Claims priority, application France, Apr. 23, 1980, 80 09113**
**Int. Cl.³ H03K *13/02***
**U.S. Cl. 340—347 AD** **10 Claims**




1. An analog-digital coder comprising charge transfer coded voltage generator means for determining by successive approximations coefficients ao . . . an, equal to 0 or 1 of an analog voltage Vx to be coded with said analog voltage Vx coded in the form

$$|Vx| = ao \cdot VR + a1 \cdot \frac{VR}{2} + a2 \cdot \frac{VR}{2^2} + \ldots + an \cdot \frac{VR}{2^n}$$

in which VR is a reference voltage; said generator means including means for carrying out said coding in two stages, said carrying out means during the first stage for processing the voltages VR and VRi,

$$VRi = ao \cdot VR + a1 \cdot \frac{VR}{2} + a2 \cdot \frac{VR}{2^2} + \ldots +$$

-continued

$$ai - 1 \cdot \frac{VR}{2^{i-1}} + \frac{VR}{2^i},$$

with i=1 to k, and k is approximately =(n+1)/2; said carrying out means for processing during the second stage for processing the voltages VR and VRi with i=n to (n−k), means for dividing by $2^k$ the processed voltages and for summing said second processed and divided voltages with the final voltage VR (k−1) produced during the first stage.

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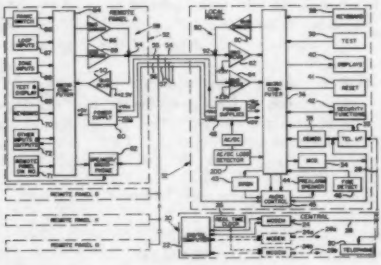
**4,392,125**

## MULTIPLEX COMMUNICATION SYSTEM USING REMOTE MICROPROCESSORS

**Hideki Iwata, Portland, Oreg., assignor to Nel-Tech Development, Inc., Portland, Oreg.**

**Filed Mar. 16, 1981, Ser. No. 244,121**
**Int. Cl.³ G08B *26/00*; H04Q *9/00***
**U.S. Cl. 340—518** **21 Claims**



1. A communications system comprising:

a local panel and a remote panel connected to the local panel by a communications line;

the remote panel including remote transmitting means for selectively transmitting a remote data signal at a first voltage level and a request signal at a second voltage level over said communications line to the local panel, the request signal being transmitted to request permission to subsequently transmit said remote data signal;

the local panel including local receiving means for receiving said remote data and request signals on said line, detector means for distinguishing the request signal from the remote data signal, and local transmitting means for transmitting a local data signal in response to the request signal;

the local data signal including a third voltage level; and

the remote panel including receiving means responsive to said third voltage level to cease transmitting said request signal.

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**4,392,126**

## COMBINATION BUCKLE AND WAIST ALARM

**Luis A. Loyola, 851 W. End Ave., New York, N.Y. 10025**

**Filed Jul. 2, 1980, Ser. No. 165,270**
**Int. Cl.³ G08B *21/00***
**U.S. Cl. 340—573** **15 Claims**

1. An alarm device of the type intended to indicate the expansion of the waist of a wearer and used in combination with a belt, said alarm device comprising:

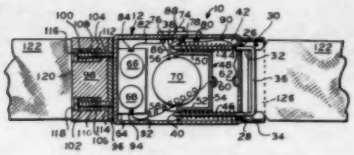
(a) a hollow housing;

(b) a member;

(c) a pair of spaced legs formed integrally with and extending from said member; said housing having a pair of spaced apertures for receiving therethrough and into said housing the free ends of said legs; said member being exterior to said housing; said apertures being so dimen-

sioned that said legs may be pivoted to an acute angle with respect to axes extending perpendicularly to the housing and through the center of said apertures;

(d) resilient means within said housing and engaging said legs for urging said legs into said housing; said resilient means comprising coiled springs about each of said legs;



(e) an alarm;

(f) electrical circuit means for coupling electrical energy to said alarm upon said legs being pulled outwardly to a predetermined position with respect to said housing; and

(g) switch means for selectively disconnecting said electrical circuit means from said alarm.

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**4,392,127**

## MOISTURE METERS OF A TYPE ESPECIALLY SUITABLE FOR ESTIMATING THE MOISTURE CONTENT OF ORGANIC MATERIALS

**Derek E. Steele, 61A Baden Ter., O'Sullivan Beach, South Australia, Australia (5166)**

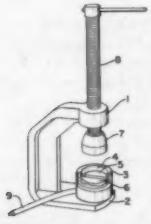
**PCT No. PCT/AU80/00002, § 371 Date Dec. 10, 1980, § 102(e) Date Dec. 10, 1980, PCT Pub. No. WO80/02199, PCT Pub. Date Oct. 16, 1980**

**PCT Filed Apr. 10, 1980, Ser. No. 224,540**

**Claims priority, application Australia, Apr. 10, 1979, PD8367**

**Int. Cl.³ G08B *21/00*; G01N *27/04***

**U.S. Cl. 340—604** **5 Claims**



1. A grain moisture feeding apparatus, comprising: means to hold grain under crushing compression within a cell, said cell containing two electrodes each with a contact face to be in contact within the cell with crushed grain and conductance testing means connected to the electrodes, said testing means including a source of substantially constant voltage, a voltage divider connected across said voltage source, said voltage divider containing two elements, one of said elements being the resistance between the two electrodes within the cell and the other element including a resistor which is selectively adjustable among several distinct values a predetermined voltage level detection means, the junction between the two elements of said voltage divider being connected to said voltage detection means, and indicator means connected to the said voltage level detection means and arranged to indicate whether the voltage connected across the voltage level detection means is above or below the said predetermined voltage level.

**4,392,128**

## SEWAGE BACK-UP ALARM

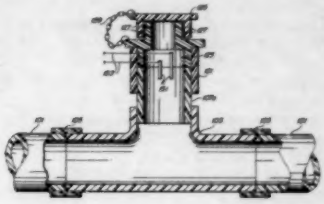
**Jack W. Young, 5510 E. 20th St., Tucson, Ariz. 85711, and Alvin G. Krill, 6026 S. Morris Blvd., Tucson, Ariz. 85706**

**Filed Oct. 9, 1980, Ser. No. 195,323**

**The portion of the term of this patent subsequent to Apr. 14, 1998, has been disclaimed.**

**Int. Cl.³ G08B *21/00***

**U.S. Cl. 340—616** **3 Claims**



1. An apparatus for sensing the pressure of sewage backup conditions in a sewer system, said apparatus comprising in combination:

(a) connecting means having an interior region and first and second openings into said interior region, said connecting means being connected in sealed relationship with a sewer pipe so that there is a continuous channel from the interior of said sewer pipe through said first opening into said interior region, whereby backed up sewage can flow from said sewer pipe into said interior region;

(b) pop-off covering means engaging said connecting means and responsive to pressure in said interior region caused by backing up of sewage in said sewage pipe for covering said second opening when the pressure in said interior chamber is low and popping off of said connecting means when said sewage backs up in said sewage pipe;

(c) sealing means for sealable engagement with both said pop-off covering means and a portion of said connecting means surrounding said second opening to effect an air-tight, waterproof connection of said pop-off covering means with said connecting means until the pressure due to sewage backup in said interior region reaches a predetermined level;

(d) first and second electrical conducting means extending into said interior region from outside of said connecting means for making electrical contact with sewage backed up into said interior region, whereby a reduced electrical resistance between said first and second electrical conducting means is produced as a result of said electrical contact with said backed up sewage; and

(e) electrical alarm means coupled to said first and second electrical conducting means for producing an alarm signal indicating the presence of said backed up sewage in said interior region.

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**4,392,129**

## MULTIPLEXED LIQUID CRYSTAL DISPLAY

**Joseph H. Mehaffey, Atlanta, and Aleksander Szlam, Marietta, both of Ga., assignors to Solid State Systems, Inc., Atlanta, Ga.**

**Division of Ser. No. 54,146, Jul. 2, 1979, Pat. No. 4,286,118. This application Mar. 27, 1981, Ser. No. 248,230**

**Int. Cl.³ G09G *3/18***

**U.S. Cl. 340—765** **2 Claims**

1. An improved multiplexed display comprising

a liquid crystal display device including a plurality of segments and a back plane;

a capacitor connected to each of said segments for temporarily storing a data bit;

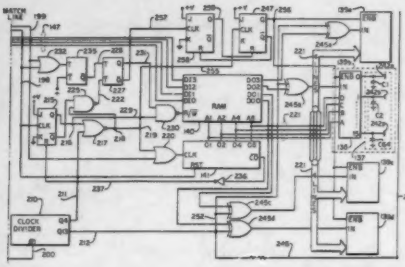
each of said segments being connected to one of a plurality of output terminals of a multiplexer;

said multiplexer including a multiplexer input and addressing means driven by a clock signal characterized by two states from a clock for successively connecting said multiplexer input to said output terminals;

means for connecting said clock signal to said back plane;

data means for providing data bits, one at a time,

said data bits corresponding to a visible output from said liquid crystal display device; and



switching means connecting said data means and said multiplexer input for providing said data bits to said multiplexer input when said clock signal is in a first state of said two states and alternately for providing the complement of said data bits to said multiplexer input when said clock signal is in a second state of said two states.

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**4,392,130**

## METHOD AND DEVICE FOR PRESENTATION OF GRAPHICAL INFORMATION

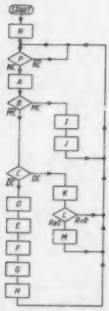
**Jan-Erik Lundström, and Ingemar Rudgard, both of Västeras, Sweden, assignors to ASEA Aktiebolag, Västeras, Sweden**

**Filed Jan. 15, 1981, Ser. No. 225,228**

**Claims priority, application Sweden, Jan. 16, 1980, 8000346**

**Int. Cl.³ G09G 1/16**

**U.S. Cl. 340—747** **6 Claims**



1. In a system for generating a display image composed of a plurality of interconnected symbols, each of which is in turn composed of a plurality of symbol modules, wherein an entry module of a symbol is displayed adjacent to an exit module of a precedingly displayed symbol, the system comprising:

a symbol memory for storing a plurality of preselected fields which describe each module of a symbol, the field format for each module including

(a) a first field comprising bits describing the state of individual pixels constituting the module,

(b) a second field comprising bits indicating in which display writing directions the module may be an entry or exit module,

(c) a third field comprising link bits for relating the position of a particular module relative to the other modules of a symbol;

input means for selecting symbols desired for display and the direction in which they are to be written; and

symbol generating means connected in circuit with the input means, the memory means, and display means, for detecting the correct entry and exit modules for a selected symbol, dependent upon a selected writing direction, and causing the display of the symbol with its detected entry module adjacent to an exit module of a precedingly displayed symbol.

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**4,392,131**

## INTEGRATABLE ACTIVATION MODULE FOR PASSIVE ELECTROOPTICAL DISPLAYS

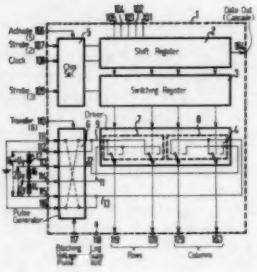
**Karl-Heinz Walter, Grafing, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Sep. 10, 1980, Ser. No. 186,142**

**Claims priority, application Fed. Rep. of Germany, Sep. 27, 1979, 2939235**

**Int. Cl.³ G09G 3/00**

**U.S. Cl. 340—803** **6 Claims**



1. An activation circuit for a passive electro-optical display which has electrodes in a matrix of columns and rows which are to be driven on a time division multiplex basis, comprising:

a shift register for receiving serial data representing information to be displayed;

a switching register connected to said shift register for receiving the data in parallel;

first and second driver groups, including m and n drivers for connection to the electrodes of the matrix, each driver respectively connected to said switching register and including a two-channel analog switch having two switch positions respectively selected by said switching register and, depending on its switch position, receiving one signal or another of a pair of analog signals; and

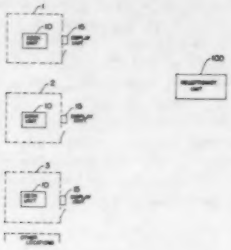
a pulse generator including six inputs, four outputs, four select switches which are externally switchable two-channel analog select switches, and two digital switches connected for operation in synchronism in complementary switching positions,

four of said six inputs receiving said different voltages, respectively, the two remaining of said six inputs connected, respectively, with the two terminals d.c. voltage source, two of said four outputs provided to emit the analog signal pairs to the row electrodes and the two other of said four outputs provided to emit analog signal pairs for the column electrodes, said select switches operable to connect a respective output with two of said inputs in such a manner that both driver groups receive, independently of one another, either row signal pairs or column signal pairs.

## 4,392,132
## WIRELESS SIGNALING SYSTEM

Harry G. Derks, Holland, Mich., assignor to Fleetwood Furniture Company, Zeeland, Mich.

Filed Jun. 15, 1981, Ser. No. 273,374
Int. Cl.³ H04Q 9/16, 9/00
U.S. Cl. 340—825.14 8 Claims



1. A signaling system for indicating status information from one or more remote locations to a central location comprising:

logic circuit means for generating periodic single frequency signals including synchronization signals and a plurality of time intervals for the insertion of data information therein, wherein each time interval bears a predetermined time relationship to said synchronization signal and corresponds to an assigned remote unit and wherein each time interval includes a plurality of discrete data intervals,

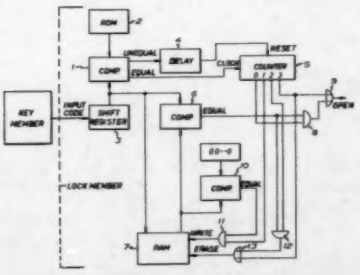
at least one remote unit including means for providing status indicating data signals, said providing means coupled to said logic circuit means for the insertion of data during a predetermined data and time interval assigned the remote unit,

a centrally located unit for receiving said data signals and including means for displaying one of a plurality of status conditions of said at least one remote location in response to said data signals.

## 4,392,133
## ELECTRONIC LOCK WITH CHANGEABLE OPENING CODE

Sten T. Lundgren, Bruksvägen 6, S-230 47 Akarp, Sweden

PCT No. PCT/SE80/00159, § 371 Date Feb. 5, 1981, § 102(e) Date Feb. 4, 1981, PCT Pub. No. WO80/02711, PCT Pub. Date Dec. 11, 1980
PCT Filed Jun. 4, 1980, Ser. No. 233,607
Claims priority, application Sweden, Jun. 5, 1979, 7904904
Int. Cl.³ H04Q 9/00; E05B 41/00
U.S. Cl. 340—825.31 16 Claims




1. An electronic lock of the type which can receive a plurality of electronic keys, each of said electronic keys having a unique key code associated therewith, one of said keys being a control key, the remaining said keys being opening keys, said lock comprising:

(A) a read only memory for storing a control code corresponding to said key code associated with said control key;

(B) an erasable memory for storing a set of opening codes; and

(C) a control circuit which compares the key code of each key placed in said lock to both said control code and said opening codes, said control circuit:

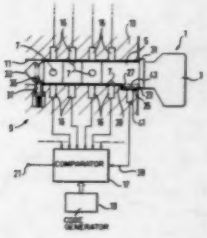
(1) opening said lock when said key code of a key placed in said lock corresponds to any one of said opening codes; and

(2) changing said set of opening codes stored in said erasable memory when said control key and one of said opening keys are sequentially placed in said lock.

## 4,392,134
## LOCKING DEVICE WITH PROGRAMMABLE KEY

Dieter Lutz, Schweinfurt, Fed. Rep. of Germany, assignor to Sach-Systemtechnik GmbH, Fed. Rep. of Germany

Continuation of Ser. No. 43,680, May 30, 1979. This application May 13, 1981, Ser. No. 263,186
Claims priority, application Fed. Rep. of Germany, Jun. 7, 1978, 2824892
Int. Cl.³ E05B 19/18, 47/00
U.S. Cl. 340—825.31 20 Claims




1. Locking device comprising a key and a reading device, said key comprising a grip portion, a plurality of information carrier parts mounted on said grip portion, information elements located in said information carrier parts for determining the locking code of said key, said information carrier parts being adjustably positionable relative to one another for arranging said information elements in a predetermined angular pattern, said reading device arranged to read the locking code on said key and to compare the locking code as read with a predetermined locking code, wherein the improvement comprises means for securing said information carrier parts to said grip portion and providing a common axis extending from said grip portion about which axis said information carrier parts are angularly adjustably positionable, and said reading device includes means for detecting one of the presence or absence of said information elements in at least a portion of the predetermined positions of the angular pattern, said means for securing said information carrier parts comprises an axially elongated member, said information carrier parts comprise annularly spaced parts encircling said axially elongated member and arranged one after the other in the axial direction of said axially elongated member, and at least one said information element on the periphery of each said information carrier part, each of said annularly shaped parts has a polygonally shaped interior surface symmetrical to the axial direction of said axially elongated member and said axially elongated part has a polygonally shaped surface on the exterior thereof complementary to said polygonally shaped interior surface, and the polygonally shaped interior surface of said annularly shaped parts extends for less than half of the axial length of said annularly shaped

part and the complementary polygonally shaped exterior surface on said axially elongated member for each of said annularly shaped parts extends for the axial length of the polygonally shaped interior surface on said annularly shaped part.

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**4,392,135**

## PAGING RECEIVERS

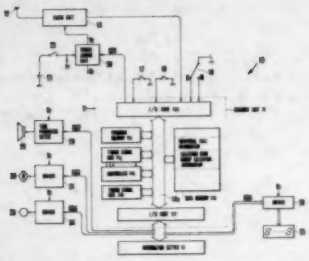
**Takashi Ohyagi, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan**

**Filed Sep. 29, 1980, Ser. No. 192,173**

**Claims priority, application Japan, Sep. 29, 1979, 54-134804[U]; Sep. 29, 1979, 54-134806[U]**

**Int. Cl.³ H04M *11/02*; H04B *1/16***

**U.S. Cl. 340—825.44** **6 Claims**



1. A paging receiver comprising:

an antenna;

a radio unit for demodulating a radio signal received by said antenna;

an information setter storing information that designates an individually assigned call number;

a decoder supplied with the output of said radio unit; and

a plurality of informing devices which make reports to a user of said receiver in accordance with decoder outputs;

said information setter comprising a first memory device storing said information designating said individually assigned call number and information designating the selection of functional options of said receiver including the selection of which of said informing devices make reports to said user; and

said decoder including a second memory device for storing information stored in said information setter, enabling said decoder to process the output of said radio unit in accordance with the information stored in said second memory device.

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**4,392,136**

## CIRCUIT ARRANGEMENT FOR STORING SIGNAL VALUES

**Werner Albrecht, Markt Bibart; Klaus Fischer, and Gerhard Grün, both of Nuremberg, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany**

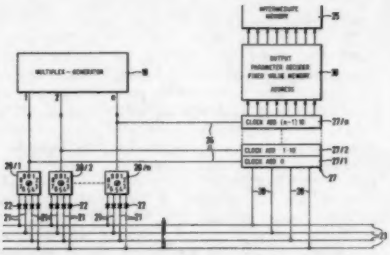
**Filed Jul. 31, 1981, Ser. No. 288,927**

**Claims priority, application Fed. Rep. of Germany, Jul. 31, 1980, 3029033; Jul. 31, 1980, 8020552[U]**

**Int. Cl.³ H04Q *9/00*; G08C *19/28*; H03K *21/36***

**U.S. Cl. 340—825.56** **4 Claims**

1. In a circuit arrangement including a plurality of multiposition data switches and a memory connected for storing, in respective addressable memory locations, representations of the positions of the data switches, the improvement wherein each said data switch is a multi-digit coding switch having an actuating input and a plurality of code outputs at which appear a set of signals representative of the setting of said switch upon appearance of a signal at said actuating input, with successive settings of each said coding switch having successive numerical values and the signals appearing at said outputs of each said coding switch representing the numerical value of the current setting of that switch, and said arrangement further comprises: multiplex generator means having a plurality of clock outputs each connected to said actuating input of a respective coding switch, said generator means being arranged to produce a sequence of pulse signals and to deliver each pulse signal of the sequence to a respective clock output; a bus bar composed of a plurality of conductors equal in number to the number of code outputs of each said coding switch, with each said conductor being connected to a respective coding output of each said coding switch so that the appearance of a signal at said actuating input of one said coding switch causes the set of signals representative of the current setting of that said switch to appear on said conductors; and signal transmitting means connected between said bus bar and said memory, said signal transmitting means comprising adding means having a plurality of data inputs each connected to a respective conductor, a plurality of stages equal in number to the number of coding



switches and each presenting a representation of a selected numerical value and arranged to add that representation to the numerical value representation supplied to that stage via said conductors, and a plurality of data outputs at which appear representations of the results of such additions; and wherein said memory has a plurality of data inputs each connected to a respective data output, and a number of memory locations equal to the number of said coding switches; each said clock output is connected to said adding means and to said memory for causing a pulse signal on a respective clock output to supply the numerical representation signals then appearing on said conductors to a respective associated adding stage and to address a respective associated memory location for storage therein of the representation then appearing at said data outputs; and the selected numerical value representation presented by each said adding means stage represents a numerical value which differs from that of every other stage by at least the number of possible settings of each said coding switch.

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**4,392,137**

## RADAR SYSTEM

**Michael J. Intlekofer, Bellevue; Jay R. Hanson, Seattle, and Thomas E. Lee, Bothell, all of Wash., assignors to Western Marine Electronics, Inc., Seattle, Wash.**

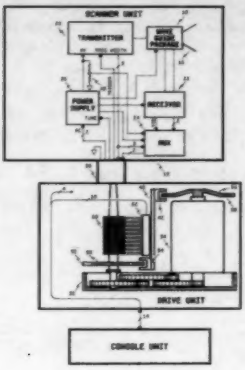
**Filed Dec. 22, 1980, Ser. No. 218,805**

**Int. Cl.³ G01S *13/00, 13/10*; H01Q *3/00***

**U.S. Cl. 343—5 SC** **5 Claims**

5. A rotatably mounted scanner unit for a radar having a directional antenna and a plurality of electronic components powered by a plurality of diverse supply voltages, said scanner unit further including a self-contained, multi-voltage power supply which generates said supply voltage from low-voltage

power applied to said scanner unit through a pair of conventional low-voltage slip rings, thereby eliminating the need for




a large number of slip rings to supply all of said supply voltages.

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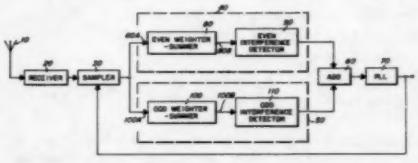
**4,392,138**

## APPARATUS AND METHOD FOR DETECTING AND INHIBITING SIGNALS INTERFERING WITH A LORAN C SIGNAL

**Steven C. Jasper, Schaumburg, and Robert V. Janc, Palos Heights, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Jan. 5, 1981, Ser. No. 222,421**
**Int. Cl.³ H04B 7/00**
**U.S. Cl. 343—103** **1 Claim**




1. An interference avoidance apparatus for substantially eliminating the corruptive effects of an interfering signal having a frequency nearly synchronized with a Loran C signal formed by a plurality of even and odd numbered Loran C pulses including in combination:

receiving means for receiving Loran C signal pulse groups and said interfering signal;

a single sampling circuit, coupled to said receiving means, for sampling said Loran C signal at most once per Loran C pulse at pulse tracking reference points thereof to generate even and odd numbered Loran C signal samples;

tapped delay line means, coupled to said sampling circuit, for separating said even numbered Loran C samples from said odd numbered Loran C samples, said even Loran C samples being provided to a first plurality of delay line outputs and said odd Loran C samples being provided to a second plurality of delay line outputs;

even phase code weighting means coupled to said first plurality of delay line outputs for weighting said even Loran C signal samples according to the respective phase code of each of said even samples to generate weighted even samples;

first summing means, coupled to said even phase code weighting means, for summing the weighted even samples so as to generate one first weighted sum per Loran C pulse group;

odd phase code weighting means coupled to said second plurality of delay line outputs, for weighting said odd Loran C signal samples according to the respective phase code of each of said odd samples to generate weighted odd samples;

second summing means, coupled to said odd phase code weighting means, for summing the weighted odd samples so as to generate one second weighted sum per Loran C pulse group;

even pulse interference detecting means, coupled to said first summing means, for selectively rejecting the even Loran C samples if the absolute value of the summation of a predetermined number of first weighted sums exceeds a predetermined threshold level;

odd pulse interference detecting means, coupled to said second summing means, for selectively rejecting the odd Loran C samples, if the absolute value of the summation of a predetermined number of second weighted sums exceeds a predetermined threshold level,

whereby the Loran C signal samples affected by said interfering signal are rejected and the remaining samples are provided output.

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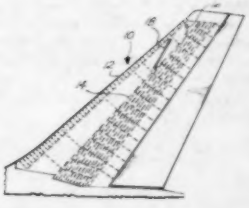
**4,392,139**

## AIRCRAFT TELEVISION ANTENNA RECEIVING SYSTEM

**Frank S. Aoyama, Redmond, and Brian P. Stapleton, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.**

**Filed Dec. 14, 1979, Ser. No. 103,815**
**Int. Cl.³ H01Q 1/28**
**U.S. Cl. 343—705** **5 Claims**



1. In an aircraft vertical fin structure, a television receiving antenna array comprising:

a first pair of cavity backed slot antennas disposed in a first major side surface of said vertical fin structure;

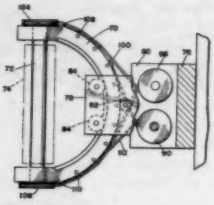
a second pair of cavity backed slot antennas disposed in a second major side surface of said vertical fin structure; and,

wherein said first pair of cavity backed slot antennas is disposed in said first major side surface of said vertical fin structure intermediate the auxiliary spar and front spar of said vertical fin structure, and said second pair of cavity backed slot antennas is disposed in said second major side surface of said vertical fin structure intermediate the auxiliary spar and front spar of said vertical fin structure.

## 4,392,140
## DUAL CABLE DRIVE ROLLING ARC GIMBAL

Thomas W. Bastian, Fullerton, and John M. Speicher, Upland, both of Calif., assignors to General Dynamics, Pomona Division, Pomona, Calif.

Filed Jul. 20, 1981, Ser. No. 285,169
Int. Cl.³ H01Q 3/08
U.S. Cl. 343—765 9 Claims

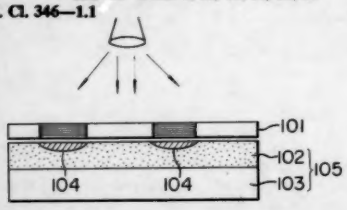


1. A cable drive rolling arc gimbal, comprising:
a base having means for attachment to a supporting structure;
an arcuate, substantially semicircular yoke supported in said base for rotation about its axis;
a platform having a supporting shaft pivotally mounted in said yoke for rotation about an axis substantially orthogonal to the axis of rotation of the yoke;
a yoke drive motor and a platform drive motor mounted on said base and separate yoke and platform cable drive means separately connecting each of said motors to a separate one of said yoke and said platform;
said platform cable drive means includes a cable connected at opposite ends to separate drive pulleys mounted on opposite ends of said platform supporting shaft; and
said platform drive motor is drivingly connected to said cable by means of a pulley intermediate to the ends of the cable.

## 4,392,141
## IMAGE FORMING METHOD

Eiichi Inoue, Tokyo; Yasushi Takatori, Machida, and Masahiro Haruta, Funabashi, all of Japan, assignors to Canon Kabushiki Kaisha, Toyko, Japan

Continuation of Ser. No. 99,889, Dec. 3, 1979, which is a continuation of Ser. No. 902,409, May 3, 1978, abandoned. This application May 14, 1981, Ser. No. 263,608
Claims priority, application Japan, May 16, 1977, 52-56193, 52-56194
Int. Cl.³ G01D 9/00, 15/10, 15/34
U.S. Cl. 346—1.1 12 Claims

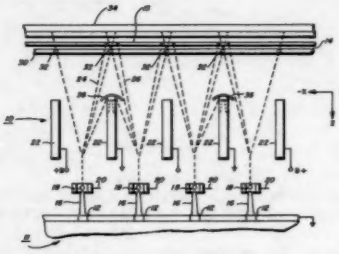



1. A high speed image forming method comprising the steps of:
(a) forming a visible image at high speed in a heat-sensitive recording medium by imagewise exposing said recording medium with low energy radiant thermal information to thereby form said visible image and a non-image portion, said visible image having a visible contrast with respect to said non-image portion and being capable of absorbing radiation rays, the wavelength of which ranges from the visible to the infrared region; and
(b) irradiating said recording medium with said radiation rays, whereby said visible image absorbs more radiation than said non-image portion to thereby selectively increase the optical density of said visible image relative to the optical density of said non-image portion.

## 4,392,142
## INK JET DROPLET SENSING METHOD AND APPARATUS

Ned J. Seachman, Penfield, and Edgar E. Price, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 15, 1982, Ser. No. 358,400
Int. Cl.³ G01D 15/18
U.S. Cl. 346—1.1 11 Claims

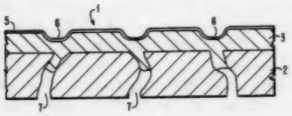


6. In ink jet printing, a method for sensing droplet passage past a sensing site comprising the steps of:
directing light from two light sources through a region through which ink droplets pass in flight;
sensing the passage of light through said region; and
determining the positioning of ink droplets in said region by comparing the intensities of light from said two sources.

## 4,392,143
## RECORD CARRIER FOR ELECTRO-EROSION PRINTERS

Dietrich J. Bahr, Herrenberg, and Marian Briska, Böblingen, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 30, 1981, Ser. No. 288,632
Claims priority, application Fed. Rep. of Germany, Sep. 3, 1980, 3033069
Int. Cl.³ G01D 15/24
U.S. Cl. 346—135.1 4 Claims



1. A record carrier for use with print electrodes of electro-erosion printers, with a gliding and scratching trace-resistant surface structure of a thin metallic layer provided over a lacquer layer on a carrier material, characterized in that
the surface of the lacquer layer (3) and consequently also the surface of the thin metallic layer (5) are provided with a multitude of shallow dimples (6) in the micrometer range which are very small compared with the front surface of the print electrodes, which are of maximum uniformity, whose rims are rounded, and which are roughly cup-shaped and of depth generally lower than their lateral

dimensions, and whose distance from each other is very much smaller than the print electrode diameter.

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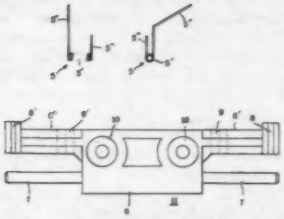
**4,392,144**

## RECORDING UNIT

**Hisao Kurata, Toyohashi, Japan, assignor to Keisuke Honda, Aichi, Japan**

**Filed Jan. 7, 1982, Ser. No. 337,946**
**Claims priority, application Japan, Jul. 1, 1981, 56-98362[U]**
**Int. Cl.³ G01D *15/06***
**U.S. Cl. 346—139 C** **2 Claims**



1. A recording unit comprising an adapter having an adapter body provided with supports at ends of arms projecting from both sides of said adapter body and with hook end supports disposed at the bases of said arms, and a coil support secured to said adapter body in parallel with said arms; and a recording or current collecting needle made of a single hard wire member and formed with a coil through which extends said coil support, one end of said hard wire member being supported by one of said supports of said adapter to act as a recording or current collecting needle and the other end thereof being a hook end which is hooked on one of said hook end supports.

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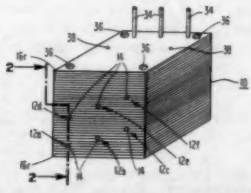
**4,392,145**

## MULTI-LAYER INK JET APPARATUS

**Walter R. Parkola, Newtown, Conn., assignor to Exxon Research and Engineering Co., Florham Park, N.J.**

**Filed Mar. 2, 1981, Ser. No. 239,612**
**Int. Cl.³ G01D *15/18***
**U.S. Cl. 346—140 R** **11 Claims**



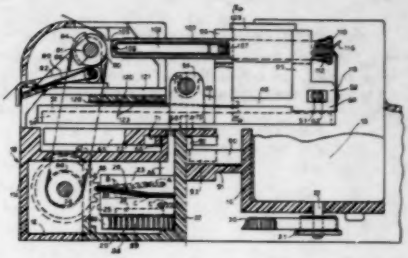
1. An ink jet apparatus comprising a plurality of channels, each of said channels including a chamber, an inlet opening to said chamber and an ink drop and ejection orifice, the improvement comprising a plurality of layers, each of said layers performing a different function in more than one channel formed by each said layer, at least one of said plurality of said layers being located between immediately adjacent orifices in different ones of said layers so as to provide a high-density multichannel array wherein the spacing between immediately adjacent chambers is substantially equal to the spacing between immediately adjacent orifices.

**4,392,146**

## NON-IMPACT DOT PRINTER

**Michele Bovio, Brusso; Pierangelo Berruti, Chivasso, and Walter Gillone, Ivrea, all of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy**

**Filed Mar. 19, 1981, Ser. No. 245,370**
**Claims priority, application Italy, Mar. 20, 1980, 67417 A/80; Feb. 2, 1981, 67134 A/81**
**Int. Cl.³ G01D *15/08***
**U.S. Cl. 346—140 R** **13 Claims**



4. An ink jet head for a printer having a movable carriage and resilient fixing means secured to said carriage, said head comprising an elongated container for the ink and handling means fixed on the container to removably mount said container on said fixing means by manual pressure, in order to permit ready replacement of the container when said ink is exhausted.

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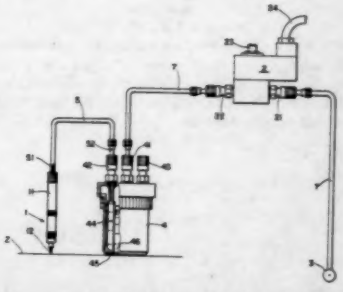
**4,392,147**

## APPARATUS FOR SUPPLYING AND REGULATING A WRITING MEDIUM TO THE WRITING UNIT OF A WRITING OR DRAWING MACHINE

**Hans-Dieter Rösel, Altdorf, Fed. Rep. of Germany, assignor to J. S. Staedtler KG, Nuremberg, Fed. Rep. of Germany**

**Filed Jun. 30, 1981, Ser. No. 279,160**
**Claims priority, application Fed. Rep. of Germany, Jun. 30, 1980, 3024678**
**Int. Cl.³ G01D *15/18***
**U.S. Cl. 346—140 R** **14 Claims**



1. In an apparatus for supplying a liquid writing medium to the writing unit of a writing or drawing device or the like, a closed air-tight container for a liquid writing medium having a bottom, said container having a substantially vertical tube therein dipping below the surface of writing medium therein, a writing unit having an ink chamber therein and a writing tip and connected to said tube in the container by a flow line, the bottom of said container disposed in substantially the same horizontal plane as said writing tip of the writing unit, means

connected to said container for supplying air under pressure to the surface of the writing medium within the container, valve means interconnected between said container and said air supplying means for regulating the flow of liquid writing medium to the writing unit by supplying writing medium when the writing unit is operative and interrupting the writing medium when the writing unit is inoperative, the surface area of the writing medium within the container being considerably greater than the surface are of the writing medium in the ink chamber within the writing unit.

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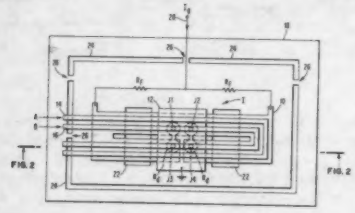
**4,392,148**

## MOAT-GUARDED JOSEPHSON DEVICES

**Wen H. Chang, Wappingers Falls; Tushar R. Gheewala, Yorktown Heights, and Erik P. Harris, Somers, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Dec. 31, 1980, Ser. No. 221,862**
**Int. Cl.³ H01L *39/22***
**U.S. Cl. 357—5** **17 Claims**



**1.** A superconductive circuit, comprising:

a continuous superconducting ground plane located on a substrate,

a superconductive circuit device located near said ground plane, said device being susceptible to magnetic flux trapped in said ground plane,

said ground plane being characterized by a cut therein, said cut extending along a perimeter surrounding said device and being continuous except for at least one small region where there is no cut, said small region being a path connecting the ground plane within the cut to the ground plane external to the cut and providing a path for the flow of electrical current therethrough.

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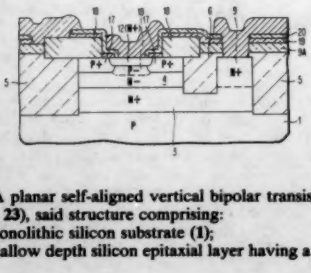
**4,392,149**

## BIPOLAR TRANSISTOR

**Cheng T. Horng; Robert O. Schwenker, both of San Jose, Calif., and Paul J. Tsang, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Division of Ser. No. 126,610, Mar. 3, 1980, Pat. No. 4,309,812.**
**This application Jun. 15, 1981, Ser. No. 273,705**
**Int. Cl.³ H01L *27/12***
**U.S. Cl. 357—49** **1 Claim**



**1.** A planar self-aligned vertical bipolar transistor structure (FIG. 23), said structure comprising:

a monolithic silicon substrate (1);

a shallow depth silicon epitaxial layer having a substantially flat exposed top surface, said epitaxial layer having a thickness of approximately 2 micrometers;

a shallow depth emitter region (FIG. 23, 12) formed in said expitaxial layer, said emitter region having an exposed essentially planar surface, said exposed planar surface of said emitter region being co-planar with said substantially flat exposed top surface of said epitaxial layer, said emitter region having a depth of approximately 200 nanometers;

an intrinsic base region (FIG. 23, 19) formed in said epitaxial layer beneath said emitter region to provide an emitter-base junction, said emitter-base junction being substantially flat and having a predetermined area, said intrinsic base region having a depth measured from beneath said emitter-base junction of approximately 200 nanometers;

an extrinsic base region (FIG. 23, 17) formed in said epitaxial layer, said extrinsic base laterally surrounding said emitter, said intrinsic base and emitter-base said junction;

a collector region (FIG, 23, 4) formed in said epitaxial layer beneath said intrinsic base region to provide a base-collector junction, said base-collector junction being substantially flat and having an area essentially equal to said emitter-base junction;

a subcollector region (FIG. 23, 3) contained in said monolithic silicon substrate beneath said collector and having a lateral extension in a first direction;

a collector reach-through region (FIG. 23, 9) laterally displaced in said first direction from said vertical bipolar transistor, said collector reach-through region extending from said substantially flat exposed top surface of said epitaxial layer to said lateral extension of said subcollector region;

an insulator region (FIG. 23, 6) positioned between said vertical bipolar transistor and said collector reach-through region, said insulator region having an upper essentially planar surface, said upper planar surface of said insulator means being essentially co-planar with substantially said flat exposed top surface of said epitaxial layer, said insulator region extending into said subcollector region and electrically isolating said extrinsic base region from said collector reach-through region;

an extrinsic base polysilicon extension region (FIG. 23, 18) contained on said substantially flat exposed top surface of said epitaxial layer and making intimate physical contact with said extrinsic base region (FIG. 23, 17) formed in said epitaxial layer, said extrinsic base polysilicon extension region having a thickness of 200 to 300 nanometers;

an emitter contact making intimate contact with said emitter region (FIG. 23, 12); and

a thin layer of insulating material consisting of silicon dioxide and silicon nitride and having a thickness of approximately 0.2 to 0.3 micrometers, said thin layer of insulating material being positioned between said emitter contact and said extrinsic base polysilicon contact.

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**4,392,150**

## MOS INTEGRATED CIRCUIT HAVING REFRACTORY METAL OR METAL SILICIDE INTERCONNECT LAYER

**Francis G. Courreges, Sandy, Utah, assignor to National Semiconductor Corporation, Santa Clara, Calif.**

**Filed Oct. 27, 1980, Ser. No. 200,648**
**Int. Cl.³ H01L *27/02, 23/48, 29/46***
**U.S. Cl. 357—51** **2 Claims**

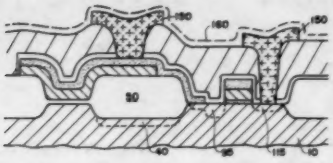
**1.** A MOS integrated circuit structure with a low resistance silicide interconnect level comprising:

a semiconductor substrate having a plurality of contact regions on the surface thereof;

an insulating layer over the surface of said substrate with openings at said contact regions so as to expose said contact regions;

a silicide layer on said insulating layer formed into electrically conductive, low resistance, contact region connect-

ing circuits, said silicide extending to, but not covering up, said contact regions; and




a polycrystalline silicon layer on top of said silicide, formed into said connecting circuits, and extending beyond said silicide layer into said contact regions so as to provide good ohmic contact with said contact regions.

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**4,392,151**

**SEMICONDUCTOR DEVICE**

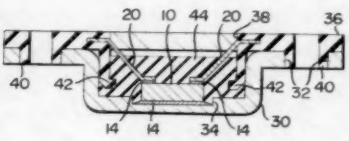
**Shiro Iwatani, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 26, 1980, Ser. No. 182,404**

**Claims priority, application Japan, Aug. 29, 1979, 54-119769[U]**

**Int. Cl.³ H01L *23/30, 23/36***

**U.S. Cl. 357—72** **2 Claims**




1. A semiconductor device comprising:

a semiconductor element including a pair of opposite main surfaces;

a plurality of solder electrodes for external connection disposed on said semiconductor element, one of said solder electrodes being disposed on one of said main surfaces of said semiconductor element, the remaining solder electrodes being disposed in a predetermined pattern on the other main surface of said semiconductor element;

a metallic casing including a positioning recess and female fitting means and forming a heat sink;

said semiconductor element being disposed in said positioning recess;

a plurality of resilient strip-shaped leads connected at first ends thereof to respective of said solder electrodes on said other main surface of said semiconductor element;

an electrically insulating plate formed by molding a heat resisting, electrically insulating resinous material so that said plate includes male fitting means capable of being fitted into said female fitting means in said metallic casing, intermediate portions of said strip-shaped leads being buried in said plate, and second ends of said strip-shaped leads extending externally of said plate; and

a quantity of a resinous material molded within said metallic casing to encapsulate said semiconductor element with said casing;

the arrangement being such that said male fitting means on said electrically insulating plate fit into said female fitting means in said metallic casing, thereby to fix said electrically insulating plate to said metallic casing and cause said strip-shaped leads to hold resiliently said semiconductor element in said positioning recess on said metallic casing, followed by soldering of said solder electrodes on said semiconductor element to said metallic casing and said strip-shaped leads.

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**4,392,152**

**SEMICONDUCTOR DEVICE**

**Yutaka Hirano, Atsugi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

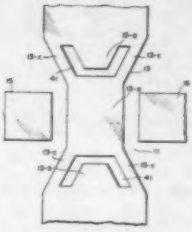
**PCT No. PCT/JP80/00036, § 371 Date Nov. 9, 1980, § 102(e) Date Oct. 31, 1980, PCT Pub. No. WO80/01966, PCT Pub. Date Sep. 18, 1980**

**PCT Filed Feb. 29, 1980, Ser. No. 201,410**

**Claims priority, application Japan, Mar. 9, 1979, 54-27303**

**Int. Cl.³ H01L *29/40***

**U.S. Cl. 357—80** **10 Claims**



1. A semiconductor device, comprising: an insulating substrate, an integral metalized layer formed on said substrate, brazing material, a lead wire extending from said semiconductor element to said metalized layer on which said semiconductor element is mounted, and a hollow hermetically sealing member having an inner wall disposed around said semiconductor element, wherein said metalized layer on which said semiconductor element is bonded by means of said brazing material and to which said lead wire extends is separated by a separation area therein into a semiconductor element bonding area where said semiconductor element is bonded to said metalized layer and a lead wire connecting area where said lead wire is connected to said metalized layer at the inside of said wall of said sealing member.

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**4,392,153**

**COOLED SEMICONDUCTOR POWER MODULE INCLUDING STRUCTURED STRAIN BUFFERS WITHOUT DRY INTERFACES**

**Homer H. Glascock, II, Scotia; Douglas E. Houston, Ballston Lake; Michael H. McLaughlin, and Harold F. Webster, both of Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 901,792, May 1, 1978. This application Nov. 6, 1978, Ser. No. 958,100**

**Int. Cl.³ H01L *25/04, 23/48, 29/44***

**U.S. Cl. 357—82** **23 Claims**

1. A cooled electronic semiconductor device for operation at high power levels with reduced internal stress comprising:

a silicon wafer with at least first and second electrodes on opposite sides of said wafer;

a first metallic layer atop said first electrode and joined thereto;

a second metallic layer atop said first metallic layer and joined thereto;

a first structured copper strain buffer including a bundle of substantially parallel closely packed strands of copper of substantially equal length, said first strain buffer having first and second opposed surfaces, one common end of said strands being thermo-compression diffusion bonded to a first metallic sheet so as to form said first opposed surface, the remaining second opposed surface of said first

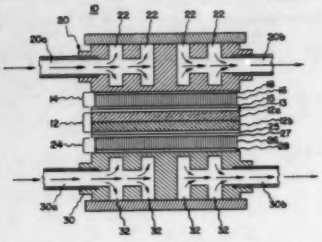
strain buffer being thermo-compression diffusion bonded to said second metallic layer;

first metallic heat sinking means for providing cooling of said device thermo-compression diffusion bonded to said first metallic sheet;

a third metallic layer below said second electrode and joined thereto;

a fourth metallic layer below said third metallic layer and joined thereto;

a second structured copper strain buffer including a bundle



of substantially parallel, closely packed, strands of copper of substantially equal length, said second strain buffer having third and fourth opposed surfaces, one common end of said strands being thermo-compression diffusion bonded to a second metallic sheet so as to form said fourth opposed surface, the remaining third opposed surface of said second strain buffer being thermo-compression diffusion bonded to said fourth metallic layer; and

second metallic heat sinking means for providing cooling of said device thermo-compression diffusion bonded to said second metallic sheet.

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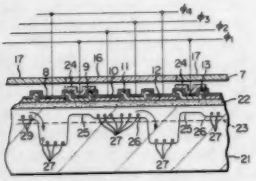
**4,392,154**

**SOLID-STATE COLOR IMAGE SENSOR**

**Kenju Horii, Ootsu, Japan, assignor to Matsushita Electronics Corp., Osaka, Japan**

**Filed Jun. 10, 1981, Ser. No. 272,169**
**Claims priority, application Japan, Jun. 17, 1980, 55-82647**
**Int. Cl.³ H04N 9/07, 3/15**
**U.S. Cl. 358—44** **6 Claims**



1. A solid-state image sensor, comprising;

a plurality of transfer electrodes disposed in parallel with each other on a semiconductor substrate of one conductivity type;

a plurality of channel stops of the other conductivity type formed on said semiconductor substrate so as to cross said transfer electrodes, whereby a photosensor region is formed;

each element in said photosensor region comprising a predetermined number of said transfer electrodes;

one of the transfer electrodes of each element which is adjacent to other elements being optically shielded; and

means for applying voltages to the transfer electrodes, respectively, of each element in such a way that during the integration time (i) the potential below one transfer electrode which does not collect signal charges becomes deeper than the potential below said optically shielded transfer electrode, (ii) the potential below the adjacent channel stop becomes deeper than the potential below said one transfer electrode which does not collect said signal charges, and (iii) the potential below said one transfer electrode which does collect said signal charges becomes deeper than the potential below said adjacent channel stop.

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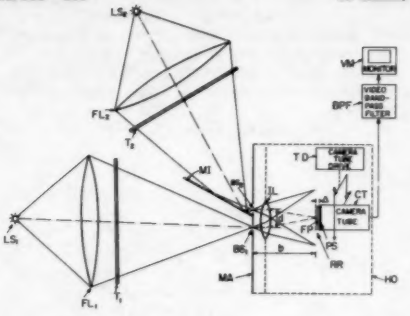
**4,392,155**

**METHOD AND APPARATUS FOR IMAGE SUBTRACTION IN ORDER TO EXTRACT NON-COMMON INFORMATION FROM TWO LIGHT IMAGES**

**Naim Konforti, Holon, and Emanuel Marom, Tel Aviv, both of Israel, assignors to Ramot University Authority for Applied Research & Industrial Development Ltd., Tel Aviv, Israel**

**Filed Dec. 12, 1980, Ser. No. 216,009**
**Int. Cl.³ H04N 7/18**
**U.S. Cl. 358—106** **16 Claims**



1. The method of image subtraction for extracting non-common information from two light images, comprising the following steps:

(a) projecting optically two light images simultaneously from slightly different angles onto a TV camera tube;

(b) spacing said two light images via a grating a predetermined short distance in front of the photosensitive coating, such that the shadow of the grating interlaces the two light images on the photo-sensitive coating;

(c) scanning electronically the interlaced light images on the photosensitive coating;

(d) processing the two images to produce information which is not common to the two images.

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**4,392,156**

**VIDEO KEY EDGE GENERATOR FOR INCREASING THE SIZE OF AN ASSOCIATED BORDER, DROP SHADOW AND/OR OUTLINE**

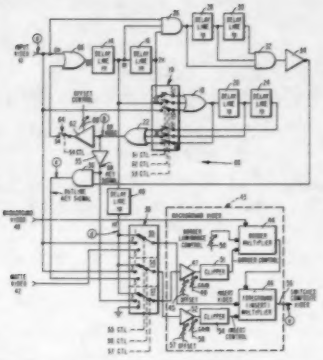
**James F. Duca, Evergreen, and Jerry A. Moline, Arvada, both of Colo., assignors to Ampex Corporation, Redwood City, Calif.**

**Filed May 4, 1981, Ser. No. 260,544**
**Int. Cl.³ H04N 5/22**
**U.S. Cl. 358—183** **11 Claims**

1. In a switcher apparatus which receives an input video signal and generates a selectively switched composite video signal having selected edge effects about a given background or insert video signal, the apparatus having delay lines of selected horizontal line delays and of selected pixel delays coupled to AND and OR function means to provide selected combinations of the delay lines commensurate with a desired edge effect, an improved edge effects generating circuit comprising;

feedback loop means integral with the delay lines and in-

cluding gate means coupled from the loop means back to the delay lines, wherein the loop means successively feeds back the input video signal to define a loop video signal waveform of selectively modified horizontal and vertical trailing edge; and



switch and multiplier means coupled to the loop means for selectively applying the modified loop video signal to the multiplier means to generate a corresponding composite video signal with the modified horizontal and vertical trailing edge effect commensurate with the desired edge effect.

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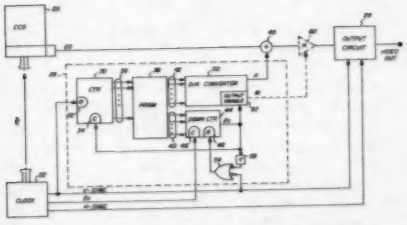
**4,392,157**

## PATTERN NOISE REDUCTION METHOD AND APPARATUS FOR SOLID STATE IMAGE SENSORS

**Enrique Garcia, Sandy Hook, Conn., and Peter L. P. Dillon, Pittsford, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 31, 1980, Ser. No. 202,400**
**Int. Cl.³ H04N *3/14, 5/30***
**U.S. Cl. 358—213** **10 Claims**



1. A method of reducing pattern noise in output signals from an array of solid state image sensing elements, comprising the steps of:

(a) operating the array under controlled illumination conditions to produce a first set of output signals representing the responses of the respective sensing elements of substantially the entire array to the controlled illumination conditions, said first set of responses forming a statistical distribution having an average and upper and lower extremes;

(b) forming, from said first set of output signals, response adjustment signals representing (1) the locations in the array of a subset of sensing elements having responses in the upper and lower extremes of the element response distribution, and (2) adjustments to the output signals produced by said subset of sensing elements to move the individual responses of said subset of elements toward said average element response;

(c) operating the array under image sensing conditions to produce a second set of output signals; and

(d) adjusting, in accordance with said individual response adjustment signals, the separate output signals in said second set that were produced by said subset of sensing elements, to reduce the pattern noise in said second set of output signals.

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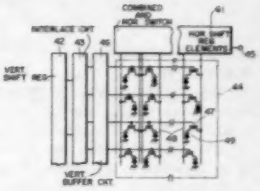
**4,392,158**

## INTERLACED SOLID-STATE IMAGING DEVICE

**Masakazu Aoki, Kodaira; Haruhisa Ando, Hachioji; Shinya Ohba; Shoji Hanamura, both of Kokubunji; Iwao Takemoto, Hinodemachi, and Ryuichi Izawa, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Apr. 24, 1981, Ser. No. 257,461**
**Claims priority, application Japan, Apr. 25, 1980, 55-54158**
**Int. Cl.³ H04N *3/14***
**U.S. Cl. 358—213** **7 Claims**



1. In a solid-state imaging device having enhanced dynamic range and including a plurality of photodiodes which are arrayed in two dimensions on an identical semiconductor body, a group of horizontal switching elements and a group of vertical switching elements for gating the signal output from the photodiodes, and a horizontal scanning circuit and a vertical scanning circuit which impress scanning pulses having a given voltage level on the horizontal and vertical switching elements respectively, and having an interlaced scanning mechanism for addressing a plurality of vertical scanning lines by means of interlace switching elements so as to permit horizontal scanning of scanning lines of a plurality of rows; said solid-state imaging device characterized in that said interlaced scanning mechanism includes means to restore said voltage level of the scanning pulses after said level has undergone a voltage drop due to said interlace switching elements.

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**4,392,159**

## METHOD AND APPARATUS FOR DIGITAL VIDEO SIGNAL PROCESSING

**Maurice G. Lemoine, and Leonard A. Pasdera, both of Redwood City, Calif., assignors to Ampex Corporation, Redwood City, Calif.**

**Filed Feb. 1, 1980, Ser. No. 117,428**
**Int. Cl.³ H04N *5/76***
**U.S. Cl. 358—319** **31 Claims**

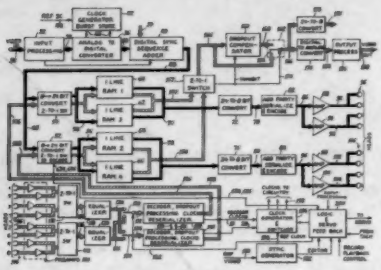
1. A method of processing a continuous digital television information signal for recording by a recording apparatus to record said digital television information signal, comprising:

supplying successively occurring increments of said digital television information at a first rate to a plurality of digital memories wherein said memories are arranged in two groups, with each group being associated with a separate information channel;

writing said increments of said digital television information sequentially into selected memories at said first rate so that each increment of said digital television information is written into one of said memories; and

reading increments of digital television information at a second rate that is slower than said first rate simulta-

neously from selected memories of each group onto said associated information channels such that all of said information in said memories is read thereon, the selected



memories being read are other than those into which increments of digital television information are being written.

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**4,392,160**

## PLAYBACK SYSTEM FOR VIDEO DISK HAVING PLURAL INFORMATION TRACKS

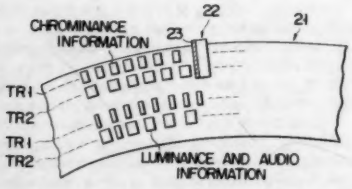
**Koichi Minemura, Fukaya, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Mar. 26, 1980, Ser. No. 134,324**

**Claims priority, application Japan, Mar. 27, 1979, 54-36120; Mar. 27, 1979, 54-36121**

**Int. Cl.³ H04N *5/80*; G11B *21/10***

**U.S. Cl. 358—327** **2 Claims**




1. A playback system for a video disc which has first and second information tracks adjacently to each other, an FM signal frequency-modulated by a video information signal being recorded on said first information track and an FM signal frequency-modulated by an audio information signal being recorded on said second information track in a different frequency band from that for said FM signal on said first information track, comprising:

stylus means for simultaneously tracing said first and second information tracks;

signal detector means coupled to said stylus means for detecting the FM signal frequency-modulated by the audio information signal and the FM signal frequency-modulated by the video information signal;

first and second filter means coupled to said signal detector means for separating the FM signal frequency-modulated by the audio information signal and the FM signal frequency-modulated by the video information signal included in the output signal of said signal detector means from each other;

first and second rectifying circuit means connected respectively to said first and second filter means;

voltage comparator circuit means connected to said first and second rectifying circuit means;

tracking compensating means connected to said voltage comparator circuit means for restoring said stylus means to a correct tracing position thereof for said first and second information tracks when said stylus means is shifted from the correct tracing position;

first FM demodulator circuit means connected to said first filter means for demodulating the audio information signal; and

second FM demodulator circuit means connected to said second filter means for demodulating the video information signal.

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**4,392,161**

## RECORDED TAPE, SPEED-CHANGE REPRODUCING SYSTEM

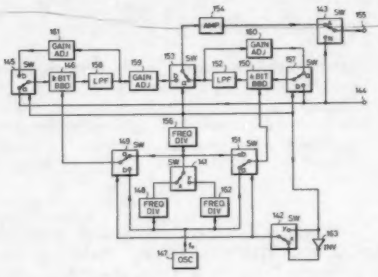
**Yoshihiko Ota, Yokohama, and Yositeru Kosaka, Kamakura, both of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan**

**Continuation of Ser. No. 915,760, Jun. 15, 1978, abandoned. This application Aug. 25, 1980, Ser. No. 181,010**

**Claims priority, application Japan, Jun. 16, 1977, 52-71374**

**Int. Cl.³ H04N *5/785***

**U.S. Cl. 360—10.3** **2 Claims**




1. A recorded tape, speed-change reproducing system comprising:

tape speed-change transport means for transporting a tape at a speed V which is represented by the equation

$$V = Vo\left(\frac{n+2}{n}\right),$$

wherein Vo is the tape speed for normal reproduction (and recording); and n is a positive integer, said tape having a video signal recorded thereon, said tape being transported past a plurality of rotary video heads having gaps of mutually different azimuth angles, said signal being recorded in parallel video tracks disposed obliquely relative to the longitudinal tape direction, and an audio signal recorded by a stationary audio head with an audio track extending in the longitudinal tape direction;

means for causing a plurality of rotary video heads having gaps of said mutually different azimuth angles, to scan said video tracks recorded on said tape when said tape is travelling at any of many different speeds, in order to reproduce said recorded video signal;

means for causing said stationary audio head to scan said audio track on said tape when said tape is travelling at any of many different speeds, in order to reproduce said recorded audio signal;

means for correcting and processing a pitch of said reproduced audio signal so that said pitch becomes substantially equal to the pitch which was originally recorded when said tape was travelling at a normal speed,

said correcting and processing means comprising:

first and second electric charge transferring element means,

the number of stages in each of the first and second electric charge transferring element means being k;

pulse oscillator means for generating first cyclically recurring pulses having a repetitive frequency fo;

first frequency dividing means for receiving said first recurring pulses and for delivering second recurring pulses having a repetitive frequency $fo.n'/(n'+2)$ wherein n' is a positive integer;

second frequency dividing means for dividing the frequency of said second recurring pulses in a ratio of 1/k;

first switching means responsive to the output of said second frequency dividing means for supplying said reproduced audio signal to a selected one of said electric charge transferring element means when said tape is travelling at a speed which is different from that used for recording and to shut off the supply of said reproduced audio signal to the other non-selected electric charge transferring element means;

second switching means responsive to the output of said second frequency dividing means for delivering an audio signal read out of said other non-selected electric charge transferring element means, as an output signal of the correcting and processing means;

third switching means responsive to the output of said second frequency dividing means for supplying said first and second recurring pulses, as clock pulses, to said other non-selected and selected electric charge transferring element means, respectively, at the time of slow-motion reproduction, and to said selected and other non-selected electric charge transferring element means, respectively, at the time of fast-motion reproduction;

said first, second and third switching means for cooperatively causing said first and second electric charge transferring element means to alternately repeat write-in and read-out in response to the output of said second frequency dividing means; and

feedback means responsive to slow-motion reproduction for feeding-back an output of the electric charge transferring element means which is then reading-out to an input of said element means.

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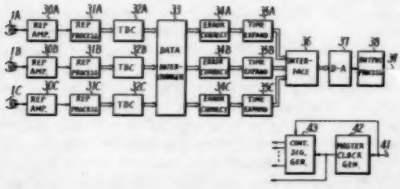
## 4,392,162
## DIGITAL VIDEO SIGNAL REPRODUCING APPARATUS

**Kaichi Yamamoto, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan**

**Filed Sep. 30, 1980, Ser. No. 192,196**
**Claims priority, application Japan, Oct. 4, 1979, 54-128338**
**Int. Cl.³ H04N 5/785**
**U.S. Cl. 360—10.3** **16 Claims**



1. Apparatus for use in a digital video signal playback device of the type having a record medium in which identifiable plural channels of digital video signals are recorded thereon in a like plurality of tracks, said apparatus comprising:

plural transducer means associated with said plural channels for reproducing said digital video signals from said plurality of tracks, each transducer means normally reproducing a respective, predetermined channel of said digital video signals;

detecting means for identifying the particular channel of the digital video signal reproduced by each of said transducer means; and

signal interchange means having plural channel outputs and responsive to said detecting means for diverting digital video signals that have been reproduced by transducer means associated with channels different from the channels of the digital video signals reproduced thereby to the proper channel outputs as determined by said detecting means.

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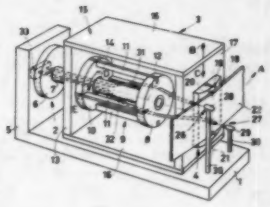
## 4,392,163
## MAGNETIC TAPE RECORDING AND/OR REPRODUCING APPARATUS WITH AUTOMATIC HEAD POSITIONING

**Albert M. A. Rijckaert; Edmond de Niet, and Jacobus P. Beun, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 16, 1980, Ser. No. 187,656**
**Claims priority, application Netherlands, Sep. 28, 1979, 7907219**
**Int. Cl.³ G11B 5/43, 21/10**
**U.S. Cl. 360—76** **9 Claims**



1. An apparatus for recording and/or reproducing signals in a plurality of parallel longitudinal tracks on a magnetic tape, comprising:

a head support,

a magnetic head having a head face adapted to allow movement of a magnetic tape thereacross during operation, and air gaps which terminate in a scanning portion of the head face for scanning respective tracks on said magnetic tape,

a positioning system attaching said magnetic head to said head support for adjustably positioning the magnetic head relative to said magnetic tape, comprising a first positioning means including piezo-electric elements for moving the head position in a first direction relative to the magnetic tape; a second positioning means comprising piezo-electric elements for pivotally moving said magnetic head in a second direction relative to the magnetic tape about a pivotal axis extending substantially perpendicularly to a plane tangential to said scanning portion of the head face; and first and second control means for generating and applying respective control signals to the piezo-electric elements of the first and second positioning means, said control signals being representative of the difference between the instantaneous and the desired position of the magnetic head relative to the magnetic tape,

characterized in that said first positioning means includes two piezo-electric elements disposed substantially parallel to each other and to said pivotal axis, on opposite sides of the pivotal axis, and arranged for moving the magnetic head in the width direction of the magnetic tape,

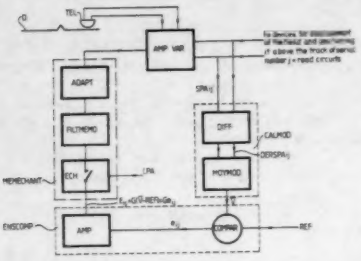
said second positioning means includes at least three piezo-electric elements each having a longitudinal axis, regularly spaced around said pivotal axis with said longitudinal axes extending substantially parallel to said pivotal axis, and

one of said positioning means is connected to the head support through the other positioning means.

## 4,392,164
## METHOD OF AND APPARATUS FOR CONTROLLING THE GAIN OF CIRCUITRY RESPONSIVE TO READ HEAD OF A MEMORY

**Jean Lequien, les Ulis, France, assignor to CII Honeywell Bull, Paris, France**

**Filed Dec. 2, 1980, Ser. No. 212,155**
**Claims priority, application France, Dec. 19, 1979, 79 31080**
**Int. Cl.³ G11B** *5/02, 5/09, 21/10*
**U.S. Cl. 360—77** **18 Claims**

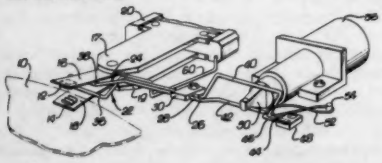



1. A circuit for controlling the amplitude of signals read by a flux change responsive head from a magnetic disc including plural concentric tracks, each of said tracks including a data zone and a reference zone, the reference zones of a pair of abutting tracks having a first axis, the data zones of a pair of abutting tracks having a second axis, the first axis being displaced from the second axis by approximately one-half the radial width of a track, the head desirably being positioned so it is centered on a data zone and straddles a pair of reference zones, each reference zone including plural cells having magnetic flux transitions which cause the head to derive a pair of opposite polarity pulses as the cells move longitudinally relative to the head, the amplitude of the pulses being a function of: (a) the distance separating the head from the disc; (b) the radial position of the head, and (c) the presence or absence of faults on the magnetic disc so that a pair of the pulses have a waveform approximating a sinusoid with an average value subject to change from cell to cell, said control circuit comprising means responsive to the pulses derived by the head as the cells move longitudinally relative to the head for deriving a first signal indicative of the deviation from a reference value of the absolute value of the derivative of the pulses, and means for controlling the amplitude of a signal derived from the head as a data zone moves longitudinally relative to the head in response to the amplitude of the first signal.

## 4,392,165
## HEAD LIFT MECHANISM

**Harold T. Wright, San Carlos, Calif., assignor to Disctron, Inc., Milpitas, Calif.**

**Filed Mar. 30, 1981, Ser. No. 248,808**
**Int. Cl.³ G11B** *5/54, 5/012, 21/22, 21/16*
**U.S. Cl. 360—105** **8 Claims**



1. A mechanism for lifting at least one magnetic head from a rotatable magnetic disc and for gently loading said at least one magnetic head upon said disc, each said at least one magnetic head being attached to one end of a different movable arm, the other end of the movable arm being attached to a carriage for translating said at least one head radially with respect to said disc, said mechanism comprising:

a rod corresponding to each said magnetic head, said rod having:

a first straight section of its length defining an axis of rotation about which said rod is rotatable;

a second section of its length offset from and parallel to said first section, said second section rotatable about said axis through an arc, said arm and said second section pressing against one another as said second section is rotated through at least a portion of said arc, the tangent to said arc where said arm and second section press against one another remaining approximately perpendicular to said arm; and

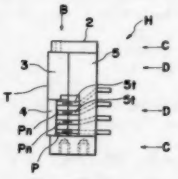
a third section of its length offset from and parallel to said first section; and

means at said third section for controllably rotating said rod about said axis so that said second section is rotated selectively in either direction through said arc, said head being lifted from said disc when the second section is rotated in one direction through a portion of said arc and loaded upon said disc when the second section is rotated in the opposite direction through a portion of said arc.

## 4,392,166
## MAGNETORESISTANCE EFFECT TYPE HEAD

**Shinzaburo Ishikawa, Hirakata; Kenji Kanai, Neyagawa; Nobuyuki Kaminaka, Moriguchi, and Tetuo Adachi, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Feb. 23, 1981, Ser. No. 237,408**
**Claims priority, application Japan, Feb. 25, 1980, 55-23442[U]**
**Int. Cl.³ G11B** *5/30, 5/12, 5/38, 5/20*
**U.S. Cl. 360—113** **5 Claims**




1. A magnetoresistance effect type head which comprises:

a casing having a U-shaped cross-section recess in one lateral surface and extending from one end edge to the other end edge, the bottom of said recess being a flat surface;

a magnetoresistance effect type head chip and a tape contact surface member in said recess and positioned against said flat surface, said head chip and said tape contact surface member being side by side in a direction across said recess and each having a tape contact surface portion along the edge thereof at one end edge of said casing, said tape contact surface portions having the same cross-sectional shape and being aligned with each other, said magnetoresistance effect type head chip having lead-out terminals on the edge thereof which faces the other end edge of said casing;

a terminal plate member in said recess against said flat surface and having one edge abutting the edges of said magnetoresistance effect type head chip and said tape contact surface member which are on the opposite sides from said tape contact surfacs and having terminal pins extending therethrough having the ends on the side abutting said magnetoresistance effect type head chip aligned with said lead-out terminals thereof; and

a cover plate member in said recess covering said magneto-

resistance effect type head chip, said tape contact surface member and said terminal plate member.

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**4,392,167**

## MAGNETIC HEAD, METHOD OF PRODUCING THE MAGNETIC HEAD

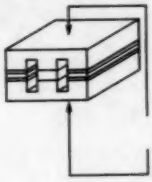
**Hendrik J. M. Joormann, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.**

**Filed Oct. 24, 1980, Ser. No. 200,112**

**Claims priority, application Netherlands, Jun. 18, 1980, 8003518**

**Int. Cl.³ G11B** *5/22, 5/251*

**U.S. Cl. 360—120** **5 Claims**



1. A magnetic head having a core of a magnetizable material which is interrupted by a gap in which at least one layer of a substantially non-magnetizable material has been provided, characterized in that one layer of substantially non-magnetizable material consists of a mixture of 95–100% of a glass comprising 12–20% by weight of $Al_2O_3$, 40–48% by weight of $B_2O_3$ and a total of 35–45% by weight of one or more of the oxides BaO, CaO or SrO and 0–5% by weight of additional constituents.

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**4,392,168**

## ROTARY HEAD ASSEMBLY

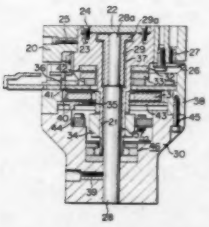
**Teruo Maruyama, Neyagawa; Takashi Ichiyanagi, Hirakata, and Ichizo Otoda, Ikeda, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan**

**Continuation of Ser. No. 66,438, Aug. 14, 1979, abandoned. This application May 14, 1981, Ser. No. 263,579**

**Claims priority, application Japan, Aug. 16, 1978, 53-100300**

**Int. Cl.³ G11B** *5/10, 21/18*

**U.S. Cl. 360—129** **11 Claims**



1. A rotary head assembly for a magnetic recording and reproducing device, comprising:

(a) a central stationary shaft having one end thereof securely joined to a main body of said assembly, and another free end, said main body comprising a lower housing and a lower cylinder having a cylindrical surface coaxial with said upper cylinder;

(b) a rotary sleeve disposed within said main body and extending into said lower cylinder for rotation about the common axis of said stationary shaft;

(c) an upper cylinder mounted on said rotary sleeve around the periphery thereof, adjacent one end of said lower cylinder, and carrying one or more video signal magnetic recording and reproducing heads, the diameter of said upper cylinder being substantially equal to the diameter of said cylindrical surface of said lower cylinder;

(d) a hydraulic bearing means defined by upper portions of said stationary shaft and said rotary sleeve, and a lubricant filled in the space between said upper portions of said stationary shaft and said rotary sleeve;

(e) a lubricant passage defined between lower portions of said stationary shaft and said rotary sleeve and in communication with said hydraulic bearing means; and

(f) a magnetic sealing means disposed within said lower housing at the lower end of said lubricant passage.

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**4,392,169**

## MAGNETIC SHIELDING SPRING

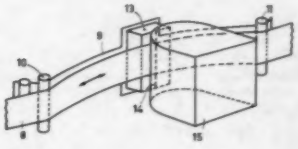
**Carolus J. Boullart, and Adrianus C. H. J. Liefkens, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 80,360, Sep. 28, 1979, abandoned. This application May 21, 1981, Ser. No. 265,867**

**Claims priority, application Netherlands, Oct. 3, 1978, 7809966**

**Int. Cl.³ G11B** *15/60*

**U.S. Cl. 360—130.33** **12 Claims**



1. A magnetic tape cassette comprising a housing having circumferential walls, one of said walls having an aperture for admitting a magnetic head connected to a magnetic tape apparatus, tape guiding means for guiding a magnetic tape present in the cassette past said aperture, tape pressure means disposed opposite said aperture, a leaf spring arranged to press the tape pressure means against the tape when a magnetic tape is present in the cassette, and means for magnetically shielding a region in the cassette adjacent said pressure means, characterized in that the leaf spring and the means for magnetically shielding together consist of a unitary element which is a strip of soft magnetic metal alloy having an amorphous structure.

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**4,392,170**

## MAGNETIC RECORDING DISC CARTRIDGE WITH DISC CLEANING MEANS

**Shuhei Okada, Toyonaka, Japan, assignor to Hitachi Maxell, Ltd., Osaka, Japan**

**Filed Jun. 1, 1981, Ser. No. 268,891**

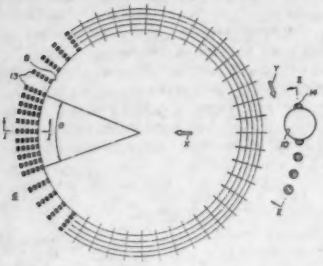
**Claims priority, application Japan, Jun. 2, 1980, 55/75151[U]; Jun. 2, 1980, 55/75152[U]**

**Int. Cl.³ G11B** *23/02*

**U.S. Cl. 360—133** **7 Claims**

1. A magnetic recording disc cartridge which comprises a magnetic recording disc, a cover jacket means having a chamber defined by a pair of opposed sheet members for rotatable accommodation of the magnetic recording disc, with the sheet members being provided with central windows on each of the sheet members for receiving a drive shaft of a recording/reproducing apparatus, at least one elongated head window for receiving a recording/reproducing head of said apparatus and at least one small index window defined at the peripheral portion of the central window on at least one of the sheet members, at least one cleaning sheet disposed between at least

one of the sheet members and the corresponding surface of the magnetic recording disc, said cleaning sheet being made of a non-woven cloth and having central windows, head windows and index windows each of which is formed corresponding to the windows defined on the sheet members, and thermally



bonding portions for bonding the sheet member and the cleaning sheet, said bonding portions being a plurality of dots formed around the peripheral portion of the central window along a plurality of lines radially extending from the peripheral edge of the central window for a predetermined distance.

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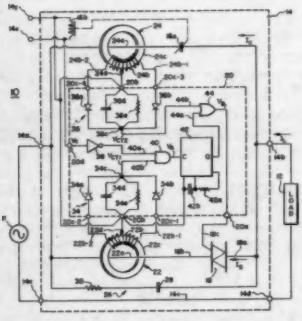
**4,392,171**

## POWER RELAY WITH ASSISTED COMMUTATION

**William P. Kornrumpf, Albany, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Sep. 8, 1981, Ser. No. 299,763**
**Int. Cl.³ H01H 33/59**
**U.S. Cl. 361—5** **10 Claims**



1. Apparatus for forming a current-carrying connection between an A.C. source and a current-consuming load, responsive to a control signal, comprising:

power relay means for selectably completing and breaking a connection between said source and said load responsive to the respective presence and absence of said control signal;

means for providing a current-carrying path shunting said power relay means responsive to a gate signal; and

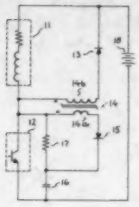
means for sensing the flow of current through each of said power relay means and said current-carrying means to provide said gating signal both (a) at least upon commencement of current flow and (b) for at least one-half cycle of the source waveform after cessation of current flow through said power relay means, to prevent formation of an arc in said power relay means during both completing and breaking of said connection.

**4,392,172**

## REACTIVE SNUBBER FOR INDUCTIVE LOAD CLAMP DIODES

**James W. B. Foley, Peru, and David J. Osterhout, Adams, both of Mass., assignors to General Electric Company, Salem, Va.**

**Filed Oct. 19, 1981, Ser. No. 312,526**
**Int. Cl.³ H02H 9/04**
**U.S. Cl. 361—8** **6 Claims**



1. An improved snubber circuit for use in a power switching circuit including at least one power switch and power clamp diode, the switching circuit being of the type responsive to control signals for connecting and disconnecting an inductive load from a power source, comprising:

(a) a saturable reactor having a primary winding and a secondary winding, said primary winding being connected in series with the clamp diode across the load, the diode being poled so as to permit continuous load current to flow when the load is disconnected from the power source by the power switch; and

(b) a shunt snubber circuit connected across the power switch, said shunt snubber circuit arranged to supply a current pulse to said secondary winding in a manner to force rapid magnetic saturation of said saturable reactor when the load is disconnected from the power source by the power switch whereby load current is rapidly transferred into the clamp diode immediately upon the clamp diode being forward biased.

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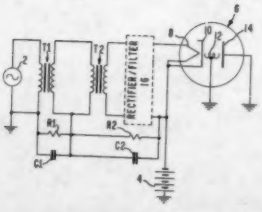
**4,392,173**

## CIRCUIT FOR REDUCING VOLTAGE STRESS ACROSS A TRANSFORMER

**Michael D. Rubin, Saratoga, Calif., assignor to Ford Aerospace & Communications Corporation, Detroit, Mich.**

**Filed Dec. 14, 1981, Ser. No. 330,344**
**Int. Cl.³ H02H 9/04**
**U.S. Cl. 361—35** **6 Claims**




1. A circuit for reducing voltage stress on a first transformer having a primary and a secondary, wherein a load coupled to said secondary has a first voltage thereacross, and an output terminal is connected to said load, to which a second voltage is applied that is much greater than said first voltage; said circuit comprising:

at least one additional transformer, so that the total number of transformers is an integer n, each transformer having a

primary and a secondary, wherein the primary of the jth transformer is connected to the secondary of the (j-1)st transformer for all j such that $2 \leqq j \leqq n$, and the secondary of the nth transformer is coupled to said load; and

a voltage dividing network for shifting some of said second voltage from across said first transformer to across said additional transformer(s), said voltage dividing network comprising:

n resistors, with one resistor connected between a primary and a secondary of each transformer; and

n capacitors, each resistor having a capacitor connected thereacross;

where $RJ(Cj+CTj)=Rk(Ck+CTk)$ for all integers j, k such that $1 \leqq j \leqq n$ and $1 \leqq k \leqq n$, where Rj is the resistance of the jth resistor, Cj is the capacitance of the jth capacitor, CTj is the interwinding capacitance of the jth transformer, Rk is the resistance of the kth resistor, Ck is the capacitance of the kth capacitor, and CTk is the interwinding capacitance of the kth transformer.

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**4,392,174**

## ELECTRIC PROTECTION DEVICE

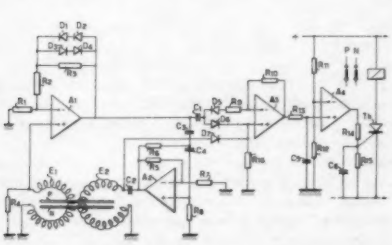
**Christian Cadet, Taverny; Bernard Dumortier, Montreuil sous Bois, and Georges Souques, Paris, all of France, assignors to La Telemecanique Electrique, France**

**Continuation of Ser. No. 137,923, Apr. 7, 1980, abandoned. This application Jun. 11, 1982, Ser. No. 387,400**

**Claims priority, application France, Apr. 6, 1979, 79 08732**

**Int. Cl.³ H02H** *3/347*

**U.S. Cl. 361—45** **9 Claims**



1. In a protection device comprising first and second differential transformers each having a toroidal magnetic core through which pass the neutral and phase conductors of an alternating current distribution circuit, and a secondary winding, the secondary winding of the first transformer being coupled to the input of a first amplifier followed by a rectifier, a threshold comparator and a control means suitable for actuating a circuit breaker, the secondary winding of the second transformer being coupled to the output of the said first amplifier, the improvement comprising an auxiliary amplifier having an input and an output, the input of the said auxiliary amplifier being coupled to the output of the first amplifier and the output of said auxiliary amplifier being coupled to the secondary winding of the second differential transformer.

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**4,392,175**

## PROTECTING DEVICE FOR A GATE TURN-OFF THYRISTOR

**Katsuhiko Takigami, Yokohama, and Minami Takeuchi, Tokyo, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Saiwai, Japan**

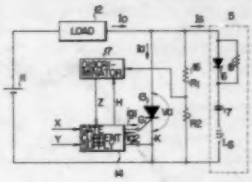
**Filed Dec. 2, 1980, Ser. No. 212,244**

**Claims priority, application Japan, Dec. 10, 1979, 54-160168; Dec. 10, 1979, 54-160169**

**Int. Cl.³ H02H** *3/20*

**U.S. Cl. 361—88** **8 Claims**

1. A protection device for a gate turn-off (GTO) thyristor included in a thyristor control circuit which comprises a DC source, a load and a Snubber circuit connected in series, said GTO thyristor being connected through a current transformer to a positive terminal of said Snubber circuit at the anode, to a negative terminal of said Snubber circuit at the cathode and, between the gate and cathode being supplied a positive gate current and a negative gate current from a gate current supply circuit for turning on and off said GTO thyristor, and said GTO thyristor being operated in such a manner that the supply of said negative gate current is commenced at a first time point, a current passage in a region between said anode and cathode is shrinked from said first time point to a second time point, the anode current of said GTO thyristor is decreased from said second time point to a third time point, the anode current is increased from said third time point to a fourth time point at which a transient voltage developed by an inductance in said Snubber circuit is reduced to substantially zero, and said anode




current is decreased again from said fourth time point, wherein said protection device comprises said current transformer and a discriminating circuit, said discriminating circuit comprising:

means for receiving an anode current signal from said current transformer and a timing signal supplied from said gate current supply circuit at said first time point,

means for obtaining a changed amount of said anode current between said third and fourth time points,

means for obtaining a ratio of said changed amount to an anode current in the vicinity of said first time point including said first time point,

means for comparing said ratio with a reference value to produce a control signal when said ratio is smaller than said reference value, and

means for supplying said control signal to said gate current supply circuit, thereby stopping the supply of said positive gate current to said GTO thyristor.

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**4,392,176**

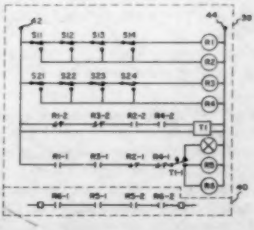
## SELF-CHECKING SAFETY MAT

**Fernand Kneip, Diekirch, and Ernest Marnach, Colmar-Berg, both of Luxembourg, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio**

**Filed Dec. 21, 1981, Ser. No. 332,930**

**Int. Cl.³ H01H** *47/22*

**U.S. Cl. 361—160** **8 Claims**



1. A safety mat for a power driven machine comprising a supporting plate, yieldable means for supporting said plate at a

predetermined level in the unloaded condition and permitting depression of said plate when supporting a person,

a main circuit for the machine, safety means interlocked with said main circuit disabling operation of the machine if a person is standing on said mat, self-checking means included in said safety means for interrupting said main circuit to prevent operation of the machine when said safety means is defective,

said safety means including a switch means activated in response to movement of said supporting plate between unloaded and depressed positions, said switch means being connected to a first relay and a second relay,

said first relay being energized when said plate is in the unloaded condition and said second relay being energized when said plate is depressed as by a person standing on said mat,

said first relay and said second relay having first contacts which are closed to energize an output relay when said plate is unloaded and which are open to de-energize said output relay when said plate is depressed and said output relay having an output contact in said main circuit for enabling said circuit upon energization of said output relay and disabling said circuit upon de-energization of said output relay,

said first relay and said second relay having second contacts which are closed to energize a timer relay for actuating a timer switch when said plate is depressed to provide said self-checking means,

wherein prior to starting the machine said timer relay is energized in response to depression of said plate and said timer switch is closed and held in a closed position for a predetermined time interval if a component of said safety means is not defective so that upon return of said plate to the unloaded position there will be energization of said first relay and de-energization of said second relay causing said output relay to be energized and said output contact closed to enable said main circuit so that the machine may be operated and wherein prior to starting the machine said timer relay will not be energized in response to depression of said plate if a component of said safety means is defective so that said timer switch will not be closed preventing energization of said output relay and closing of said output contact so that operation of the machine is prevented.

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**4,392,177**

## TRANSPORTING ROLLER FOR WEBS OF PHOTOSENSITIVE MATERIAL OR THE LIKE

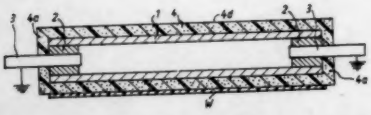
**Erwin Geyken, Neubiberg, Fed. Rep. of Germany, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Sep. 23, 1980, Ser. No. 189,826**

**Claims priority, application Fed. Rep. of Germany, Sep. 28, 1979, 2939473**

**Int. Cl.³ H05F *1/00***

**U.S. Cl. 361—221** **22 Claims**



1. A device for the guidance and/or transport of flexible radiation-sensitive articles, particularly for the transport of x-ray films in the dry region of a processing machine, comprising a shaft having first and second end portions comprising electrically conductive materials; and a cylindrical article-contacting member coaxially surrounding said shaft so that at least one of said end portions remains exposed, said member comprising a synthetic plastic material selected from the group consisting of hard polyvinyl chloride, fine crystalline polyamides, polypropylene, polyethylene and mixtures thereof, said member being connected with ground and further comprising pulverulent silver which is embedded in said plastic material to thereby rapidly disperse electrostatic charges and prevent discharges which generate light detrimental to radiation-sensitive articles, said member being in conductive contact with said end portions and the quantity of silver in said plastic material being such that said member has a surface resistance of at least about $1\times10^{10}$ ohms.

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**4,392,178**

## APPARATUS FOR THE RAPID CONTINUOUS CORONA POLING OF POLYMERIC FILMS

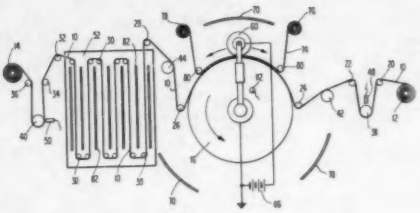
**Peter F. Radice, King of Prussia, Pa., assignor to Pennwalt Corporation, Philadelphia, Pa.**

**Filed Oct. 16, 1980, Ser. No. 197,463**

**The portion of the term of this patent subsequent to Dec. 21, 1999, has been disclaimed.**

**Int. Cl.³ H01F *1/02***

**U.S. Cl. 361—233** **43 Claims**



1. Apparatus for continuously enhancing piezoelectric properties of polymeric film exhibiting such properties comprising

a rotating drum contacting said film for transport thereof along a defined path,

a corona discharge electrode roller mounted for movement along circumference of said drum in an oscillating motion normal to axis of rotation of said rotating drum, said film having at least one area in constant contact with said rotating drum and oscillating electrode, and

means for providing continuous corona discharge from said electrode through said film substantially at said contact area for poling said film.

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**4,392,179**

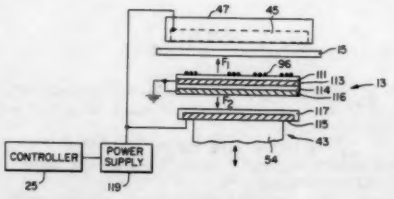
## APPARATUS AND METHOD FOR SEPARATING ADHERING MEDIA ELECTROSTATICALLY

**Alfred M. Nelson, Redondo Beach, Calif., and Houshang Rasekhi, Convent Station, N.J., assignors to Wang Laboratories, Inc., Lowell, Mass.**

**Filed Jul. 9, 1981, Ser. No. 281,747**

**Int. Cl.³ H01F *13/00***

**U.S. Cl. 361—234** **11 Claims**




1. Apparatus for facilitating separation of a first medium from a second medium, the first medium being separably dis-

posed proximate to the second medium, the apparatus comprising:

a member having an electrically conductive first layer and an electrically insulative layer;

the first medium having an image layer disposed for contact with the second medium and an electrically conductive second layer disposed for contact with the insulative layer, the insulative layer being a dielectric positioned between the first and second conductive layers; and

a voltage source coupled to provide a predetermined potential difference between said conductive first and second layers creating an electrostatic force therebetween, attracting the first medium to the member and away from the second medium for a selected period of time.

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**4,392,180**

## SCREEN-PRINTABLE DIELECTRIC COMPOSITION

**Kumaran M. Nair, East Amherst, N.Y., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 169,495, Jul. 16, 1980, abandoned. This application Apr. 29, 1982, Ser. No. 373,279**

**Int. Cl.³ C04B *35/46***

**U.S. Cl. 361—321** **20 Claims**

1. A dielectric powder composition for making hermetic dielectrics having an insulation resistance (IR) drop of no more than one order of magnitude after immersion in water at 50° C. for 10 days consisting essentially of a finely divided admixture of (a) a substituted perovskite of the formula $Ba_{1-x}Sr_xTiO_3$ wherein X is from 0.1 to 0.9, (b) at least one inorganic dopant containing an ionic species selected from the cations $Bi^{3+}$-$Ca^{2+}$+$Cs^{1+}$+$Fe^{2+}$+$Fe^{3+}$+$Pb^{2+}$+$Zn^{2+}$ and the anion $F^-$ and mixtures thereof, and (c) a low temperature melting devitrifiable glass or frit having a specific viscosity (log $\eta$) at the firing temperature of less than 6 and in which the relative proportions of the components, by weight, are 30–90% (a) 10–35% (b) and 1–7% (c).

20. An hermetic multilayer capacitor having an insulation resistance (IR) drop of no more than one order of magnitude after immersion in water at 50° C. for 10 days and comprising a first conductor terminal and a plurality of alternating printed dielectric films and overlying conductor terminals. The dielectric film consisting essentially of (a) a substituted perovskite of the formula $Ba_{1-x}Sr_xTiO_3$ wherein X is from 0.1 to 0.9, (b) at least one inorganic dopant containing an ionic species selected from the cations $Bi^{3+}$+$Ca^{2+}$+$Cs^{1+}$+$Fe^{2+}$+$Fe^{3+}$+$Pb^{2+}$+$Zn^{2+}$ and the anion $F^-$ and mixtures thereof, and (c) a low temperature melting devitrifiable glass or frit, the assemblage having been cofired at below 900° C. to remove the inert liquid therefrom and to effect liquid phase sintering and cooled to effect devitrifcation of the glass or frit having a specific viscosity (log $\eta$) at the firing temperature of less than 6, and in which the relative proportions of the components, by weight, are 30–90% (a) 10–35% (b) and 1–7% (c).

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**4,392,181**

## CIRCUIT BOARD AND CONTACT ASSEMBLIES

**Gary D. Jabben, Shreveport, La., assignor to Western Electric Company, Inc., New York, N.Y.**

**Filed May 1, 1981, Ser. No. 259,748**

**Int. Cl.³ H05K *1/18***

**U.S. Cl. 361—401** **4 Claims**

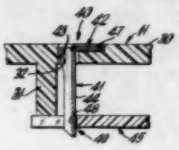
1. A circuit board and contact assembly which comprises:

a substrate having a plurality of mounting aperatures formed therein;

a flange depending from a lower surface of the substrate along an edge of the substrate;

a plurality of interconnect terminals, each having an elongated body section mounted in an associated aperature comprising a tail section extending through the aperature and projecting from the lower surface of the substrate a distance greater than the flange depends from the the lower surface; and a 90° extending contact head section fitting flat against an upper surface of the substrate adjacent to the aperature;

a plurality of conductive circuit elements formed on the upper surface of the substrate after the terminals have been mounted on the substrate so that a contact end portion of each circuit element overlaps and is attached to the contact head of a selected terminal so as to provide mechanical and electrical connection between the conductive elements and the associated terminals; and



a second substrate having a plurality of aperatures formed therein, each aperature of the second substrate being positioned such that one or more surfaces of the walls of each aperature make physical contact with the tail section of a terminal when the second substrate is located against the flange depending from the first substrate.

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**4,392,182**

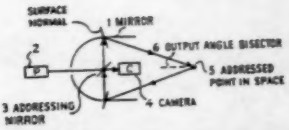
## ARRANGEMENT FOR SCANNING POINTS IN SPACE

**Paul Di Matteo, Huntington, N.Y., assignor to Solid Photography, Inc., Melville, N.Y.**

**Filed Jun. 12, 1981, Ser. No. 273,044**

**Int. Cl.³ G03B *15/02***

**U.S. Cl. 362—5** **6 Claims**




1. Arrangement for scanning an addressed point in space, comprising: a light source; a camera at which light from a light source is directed; deflector means interposed between said source and camera and through which light can pass from the source to the camera; and rotary addressing mirror means in the path of the light intermediate said deflector means and camera, so that light from the source is deflected by the addressing mirror means, from there to the addressed point in space, and from there via the deflector means and the addressing mirror means to the camera.

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**4,392,183**

## DEVICE IN CONNECTION WITH CAMERAS

**Roland Östlund, Furuslätten 60, 42700 Billdal, and Rolf Östlund, Trädesvägen 15, 44600 Alvängen, both of Sweden**

**Filed May 29, 1981, Ser. No. 268,182**

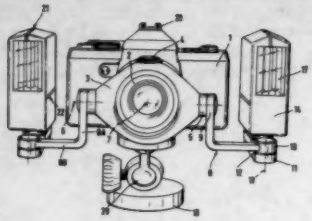
**Claims priority, application Sweden, May 30, 1980, 8004046**

**Int. Cl.³ G03B *15/02***

**U.S. Cl. 362—11** **9 Claims**

1. A device for supporting a plurality of flashlight units at a camera having a lens with a lens socket defining a central axis, said device comprising: a holder, means for attaching said holder to said lens socket, at least two first arm means connected to said holder at diametrically opposite positions so as to be pivotable about first axes on opposite sides of said socket and at right angles to said central axis, said first arm means having ends remote from said socket, and at least two second

arm means respectively pivotally connected to said remote ends so as to be pivotable about second axes, and at least two



flashlight units respectively supported on said second arm means.

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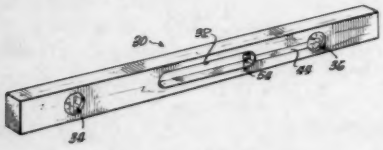
**4,392,184**

## ILLUMINATING METHOD AND APPARATUS FOR CARPENTER'S OR MECHANIC'S LEVELS

**Owen E. Hearold, and Harvey G. Bennett, both of P.O. Box 1065, Minden, Nev. 89423**

**Filed Feb. 20, 1981, Ser. No. 236,333**
**Int. Cl.³ F21V *33/00***
**U.S. Cl. 362—101** **5 Claims**



1. The method of illuminating a carpenter's or mechanic's level comprising: placing an illuminating device within the body of a level; and directing light from the illuminating device in such manner that it enters the leveling fluid through one end of a vial containing the fluid and travels through the fluid to the other end.

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**4,392,185**

## EXPLOSION-PROOF AND FIREDAMP-PROOF HEADLIGHT

**Karl Grossmann, Hünxe, and Robert Mullejans, Mülheim, both of Fed. Rep. of Germany, assignors to Friemann & Wolf GmbH, Duisburg, Fed. Rep. of Germany**

**PCT No. PCT/DE80/00023, § 371 Date Nov. 14, 1980, § 102(e) Date Oct. 10, 1980, PCT Pub. No. WO80/01944, PCT Pub. Date Sep. 18, 1980**
**PCT Filed Mar. 1, 1980, Ser. No. 197,999**
**Claims priority, application Fed. Rep. of Germany, Mar. 14, 1979, 2909965**
**Int. Cl.³ F21L *15/14***
**U.S. Cl. 362—105** **5 Claims**

1. An explosion-proof and firedamp-proof headlamp, e.g. for mines or the like, comprising in combination:

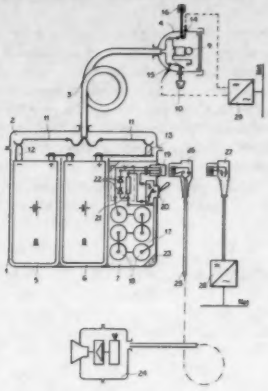
a headpiece provided with at least one incandescent lamp;

a connecting cable running to said headpiece and including conductors connected to said incandescent lamp;

a belt-supported battery housing, said battery housing being formed with a plurality of compartments;

a lamp battery replaceable in one of said compartments, said housing being provided with circuitry for connecting the conductors of said cable to said lamp battery;

an additional battery having an intrinsically safe output circuit received in another compartment of said housing and electrically isolated from said circuitry and from said cable for supplying energy for an electrically operated unit such as an instrument or radio; and



a socket mounted in a wall of said housing and accessible from a location externally thereof, said socket having terminals electrically connected to said additional battery.

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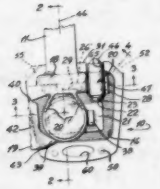
**4,392,186**

## KEY WITH LIGHT IN HANDLE

**Avi Cziment, 6732 de Vimy Ave., Montreal, Quebec, Canada**

**Filed Dec. 15, 1980, Ser. No. 216,443**
**Int. Cl.³ F21V *33/00***
**U.S. Cl. 362—116** **8 Claims**



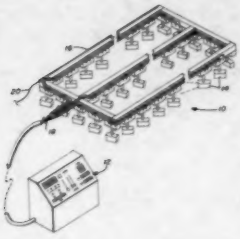
1. A key handle comprising a housing for securement to a key shaft, said housing having a base and a cover member defining an internal chamber therebetween, a key shaft retention cavity defined between said base and cover member to removably retain a connecting end of said key shaft, a switch member formed as a unitary molded part and retained in said chamber, said switch member having two spaced apart outwardly extending flexible arms to bias a flat circular dry cell battery to a first position in said chamber with a first flat wall terminal of said battery lying against a contact element which is in electrical contact with a first terminal of a lamp retainable in said chamber to direct light outwardly of said housing in the direction of said key and further maintaining a circumferential terminal of said battery away from a further contact element in contact with a second terminal of said lamp, said further contact element being said connecting end of said key secured in said housing and centrally aligned between said flexible arms, said connecting portion having a contact portion spaced from said battery and a lamp engaging portion in contact with said second terminal of said lamp, said switch member having an actuable portion accessible from the exterior of said housing to displace said battery in its flat horizontal plane against the biasing force of said flexible guide means whereby said circumferential terminal of said battery is positioned in electrical contact with said further contact element to cause an electric current to flow through said lamp and cause it to light.

4,392,187

## COMPUTER CONTROLLED LIGHTING SYSTEM HAVING AUTOMATICALLY VARIABLE POSITION, COLOR, INTENSITY AND BEAM DIVERGENCE

James M. Bornhorst, Duncanville, Tex., assignor to Vari-Lite, Ltd., Dallas, Tex.

Filed Mar. 2, 1981, Ser. No. 239,367
Int. Cl.³ F21P 3/00
U.S. Cl. 362—233 27 Claims



1. A lighting system comprising:

a plurality of light surces for producing directable beams of light, each said light source pivotally mounted to a support member;

at least one dichroic filter pivotally mounted for pivotal motion in each said light beam for transmitting light of a preselected color, the angle of incidence of the light on the dichroic filter being variable to alter the saturation and hue of light transmitted as the dichroic filter is pivoted;

means for pivoting each said dichroic filter;

pivoting means for pivoting each said light source to a preselected position;

controller means for input of information including unique coded addresses each representing a different selected one of said light sources and data representing the preselected position and color of said selected one of said light sources;

transmitter means for transmitting the information;

a communications channel coupled to said transmitter means for carrying all of said information; and

receiver means coupled at spaced apart locations to said communications channel and associated with each of said light sources for receiving the information and reading the coded addresses, each said receiver means responsive to only one of coded addresses for reading the positioning and color data and activating said pivoting means to pivot said selected one of said light sources to the preselected position and further controlling said dichroic filter pivoting means to select the desired color of the light beam.

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4,392,188

## TROUBLE LIGHT ASSEMBLY POSITIONER

Kenneth E. Norris, 61352 Tombstone Dr., Montrose, Colo. 81401

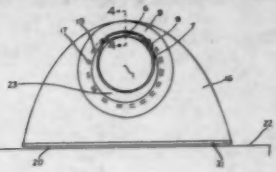
Filed Mar. 4, 1982, Ser. No. 354,604
Int. Cl.³ F21V 21/26
U.S. Cl. 362—269 13 Claims

1. A trouble light assembly positioner which comprises:

(a) means for resistably rotating the trouble light assembly about an axis parallel to its longitudinal axis;

(b) means for attaching the resistably rotating means to the trouble light assembly such that they rotate as an integral unit; and

(c) a support member which rotatingly engages the resistably rotating means, with the support member horizontal rotational axis, the trouble light assembly horizontal longitudinal rotational axis and the resistably rotating means horizontal rotational axis all parallel, with at least part of the weight of the trouble light assembly transmitted through the resistably rotating means to the support member, with the support member having at least one flat bearing surface on its periphery which communicates with a foreign surface to prevent rotation of the support



member, so that the trouble light assembly may be rotated relative to the support member to any position about the horizontal rotational axis of the resistably rotating means, which allows the desired lighting effect.

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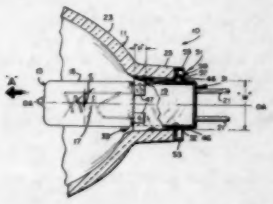
4,392,189

## FRONT LOADING PROJECTION UNIT WITH THREADED RESILIENT RETENTION MEMBER

Harold L. Hough, Beverly, and Ronald G. Blaisdell, Saugus, both of Mass., assignors to GTE Products Corporation, Stamford, Conn.

Filed Dec. 3, 1980, Ser. No. 212,469
Int. Cl.³ F21V 7/00
U.S. Cl. 362—306 7 Claims



1. In a projection unit including a glass reflector having a front concave reflecting portion and a rear neck portion with an opening therein, an incandescent lamp including an envelope portion and a sealed end adjacent said envelope portion, a first retention member secured to said sealed end of said lamp for retaining said lamp therein and aligning said lamp within said reflector whereby said envelope portion will be positioned substantially within said front concave reflecting portion and said sealed end will be positioned substantially within said opening within said rear neck portion, said first retention member removably positioned within said opening and adapted for being removed through said front concave reflecting portion of said reflector, and a second retention member for retaining said first retention member within said opening of said reflector and permitting removal thereof through said front concave reflecting portion, the improvement wherein said second retention member comprises:

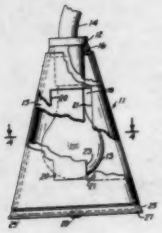
a resilient member rotatively positioned on an external surface of said first retention member and capable of being removed therefrom, said rotative member engaging said rear neck portion of said reflector to effect said retention of said first retention member within said opening of said reflector once said first retention member is fully inserted within said reflector opening, said first retention member being of substantially boxlike configuration and having first and second threaded sections on opposite sides thereof, said resilient member comprising a substantially annular spring nut threaded on said threaded sections to provide said retention.

**4,392,190**

## SHADED LAMP FOR READING AND LIKE PURPOSES

**Garthop Upton, 1218 Montego, Arroyo Grande, Calif. 93420**

**Filed Jan. 6, 1981, Ser. No. 222,951**
**Int. Cl.³ F21V** *17/02*
**U.S. Cl. 362—281** **8 Claims**



1. A lamp for reading or similar purpose comprising:
a base for supporting a light source therebelow;
a first shade having a shape to surround said light source;
means on said base for supporting said first shade at the upper end thereof;
said first shade having a first opening therein for permitting passage of light therethrough from said light source;
a second shade having a shape to surround said first shade;
said second shade having a second opening for permitting passage of said light therethrough from said first opening;
said second shade adapted for rotational adjustment about said first shade whereby to cause said opening to vary the amount of light passing therethrough;
a first shade element extending across the lower end of one of the above-mentioned shades;
said first shade element having a third opening therein;
a second shade element extending over said first shade element;
said second shade element having a fourth opening therein for passing light therethrough from said third opening; and
means supporting said second shade element for movement relative to said first shade element whereby to cause said third and fourth openings to vary the amount of light passing therethrough.

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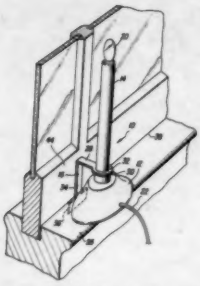
**4,392,191**

## CANDLE ASSEMBLY INCLUDING A WINDOWSILL STABILIZER

**James S. White, Sr., 5931 Westone Rd., Mechanicsville, Va. 23111, assignor to James Sanford White, Sr. and James Sanford White, Jr., both of Mechanicsville, Va.**

**Filed Feb. 12, 1982, Ser. No. 348,619**
**Int. Cl.³ F21P** *1/02*
**U.S. Cl. 362—392** **8 Claims**

1. A candle assembly comprising:
an elongated candle to be normally held at a lower and thereof in a generally vertical orientation and having a light-source means mounted at an upper end thereof for giving off light;
a base member attached to the lower end of the candle to form a candle/base composite, said base member having a bottom surface for resting on a generally flat surface and thereby supporting said candle in said generally vertical orientation;
a candle-assembly stabilizer engaging said candle/base composite, said candle-assembly stabilizer including a thin flat means positioned below said basemember bottom surface for insertion into a space at an interface of a rear edge of a windowsill and a lower front face of a sash-type window frame, said thin, flat, portion providing a force fit in said space to thereby stabilize support for said candle assembly



when said bottom surface of said base is resting on said windowsill.

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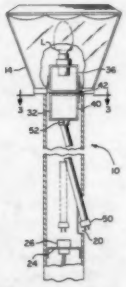
**4,392,192**

## LAMP STANDARD ASSEMBLY

**Rufus P. Steadman, Rte. 1, Box 333, Middleton, Tenn. 38052**

**Filed Apr. 29, 1982, Ser. No. 373,129**
**Int. Cl.³ F21V** *19/02*
**U.S. Cl. 362—418** **11 Claims**



1. A lamp standard assembly comprising:
(a) a lamp standard including an elongate lower ground-supported post having an upper lamp-receiving opening, a lower access opening and an electrical supply means,
(b) a lamp assembly including a head and a stem, the head including a lamp-carrying means and the stem including conductor means, the conductor means being operatively connected between the lamp carrying means and the electrical supply means, and
(c) pivot means operatively connecting the lamp-carrying means and the stem to permit relative axial movement between the lamp-carrying means and said stem so that the head can be received through the access opening and pushed longitudinally up the post by the stem and through the lamp receiving opening.

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**4,392,193**

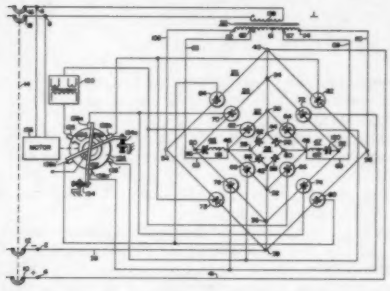
## RECTIFYING AND INVERTING APPARATUS

**Frank V. Frola, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Sep. 1, 1964, Ser. No. 393,695**
**Int. Cl.³ H02M** *7/757*
**U.S. Cl. 363—128** **11 Claims**

1. In an apparatus for transferring electrical energy between

a unidirectional potential circuit and an alternating potential circuit, a pair of unidirectional potential busses adapted to be connected to the unidirectional potential circuit, a pair of alternating potential busses adapted to be connected to the alternating potential circuit, a transformer having first and second winding parts, said second winding part having first and second pairs of connections, means connecting said first winding part to said alternating potential busses, first and second separately energized current conducting paths connecting said first pair of connections of said second winding part to said unidirectional potential busses for transfer of energy from said unidirectional busses to said alternating potential busses, said first path when conductive being effective to conduct current between said unidirectional busses in one direction and through a first portion of said second winding part in a first direction to thereby induce a potential of a first polarity in said first winding part, said second path when conductive being effective to conduct current between said unidirectional busses in said one direction and through said first portion of said second winding part in a direction opposite to said first direction to thereby induce a potential of a second polarity in said first winding part, said second polarity being opposite to said first polarity, third and fourth separately energized current conducting paths connecting said second pair of connections of said second winding part to said unidirectional potential busses for transfer of energy from said alternating potential busses to said unidirectional potential busses, said



third path when conductive being operable to conduct current between said unidirectional busses in a second direction through a second portion of said second winding part, said fourth path when conductive being operable to conduct current between said unidirectional busses in said second direction through said second portion of said second winding part, the turns of said winding parts being arranged such that the ratio of the turns of said first winding part with respect to the turns of said second winding part which are located between said first connections is greater than the ratio of the turns of said first winding part with respect to the turns of said second winding part which are located between said second connections, and means rendering said first path conductive solely for a first predetermined interval of each first half cycle of current flow through one of said winding parts and thereafter rendering conductive for the remainder of each of first half cycles of said current in said one winding part the one of said third and fourth paths which connects the said second pair of connections for the flow of current from the most positive one of said second pair of connections to the most negative one of said second pair of connections, said last-named means being operable to render said second path conductive solely for a second predetermined interval of each second half cycle of the current flow through said one winding part and thereafter rendering conductive for the remainder of each of said second half cycle of said current in said one winding part the other of said third and fourth paths.

**4,392,194**

## CIRCUIT ARRANGEMENT FOR CONTROLLING A LARGE NUMBER OF PRINTING ELECTRODES FOR NON-MECHANICAL PRINTING

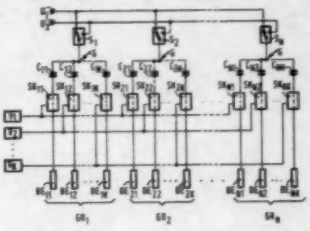
**Hans D. Hinz, Tornesch, and Herbert Löbl, Hamburg, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 25, 1981, Ser. No. 237,817**

**Claims priority, application Fed. Rep. of Germany, Feb. 28, 1980, 3007465**

**Int. Cl.³ G01D *15/06***

**U.S. Cl. 346—154** **11 Claims**



1. A circuit arrangement for controlling a large number of printing electrodes for the non-mechanical parallel printing of character elements or image elements, the printing electrodes being combined to form groups, each of which has a common switching point, corresponding printing electrodes of each group being associated with a common voltage amplifier via electronic control elements, a selected printing electrode being controlled by the switching of a group switch and an amplifier, characterized in that a capacitor (C) is connected between the common switching point (G) of a group of printing electrodes and the electrical control element (SK) associated with each printing electrode (BE), the capacitor (C) associated with an arbitrary printing electrode (BE) being charged to the analog voltage generated in the associated amplifier (V) by the closing of the group switch (S) of the relevant group, said voltage determining the printing effect of the associated printing electrode (BE), the discharging of the capacitor (C) which takes place after the opening of the group switch (S) during the printing time for an image element by the associated printing electrode (BE) being substantially slower than the preceding charging, the capacitors (C) being group-wise successively charged to the voltages which are analogous to the information to be printed, the time required for the charging of all capacitors (C) being less than the printing time for one image element.

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**4,392,195**

## METHOD OF AND APPARATUS FOR CONTROLLEDLY MOVING A MOVABLE ELEMENT

**Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japax Research Incorporated, Yokohama, Japan**

**Filed Oct. 1, 1980, Ser. No. 192,876**

**Claims priority, application Japan, Oct. 3, 1979, 54-128229**

**Int. Cl.³ G06F *15/46***

**U.S. Cl. 364—167** **28 Claims**

1. A method of controlledly moving a movable element in a machine tool having a drive member drivingly coupled to the movable element, motor means drivingly coupled to the drive member, and motor driver circuit means for energizing the motor means to drive the drive member, thereby moving the movable element, said method comprising the steps of:

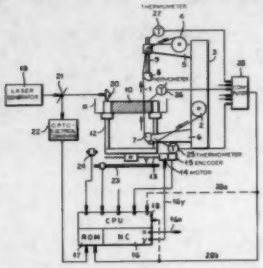
(a) applying a sequence of feed signals from a command source to said motor driver circuit means, thereby energizing said motor means to achieve a corresponding sequence of desired movements of said movable element;

(b) sensing an actual displacement of said movable element resulting from the application of each of said feed signals

to said driver circuit means and said motor means to provide a first signal as a function of said actual displacement;

(c) sensing said feed signals to provide a sequence of second signals each as a function of each of said feed signals;

(d) successively memorizing on a memory medium, said first signals corresponding to the sequence of said second signals;




(e) successively reproducing said first signals memorized on said memory medium corresponding to the sequence of said second signals while permitting said feed signals to be issued in sequence from said command source; and

(f) processing said reproduced first signals and said feed signals to provide a sequence of revised feed signals and applying said revised feed signals to said driver circuit means, thereby achieving the desired movements in sequence of said movable element.

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**4,392,196**

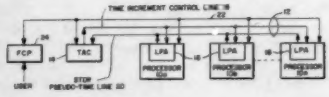
**MULTI-PROCESSOR TIME ALIGNMENT CONTROL SYSTEM**

**Raymond R. Glenn, and David Bell, both of Palm Bay, Fla., assignors to Harris Corporation, Melbourne, Fla.**

**Filed Aug. 11, 1980, Ser. No. 176,798**

**Int. Cl.³ G06F *1/00***

**U.S. Cl. 364—200** **22 Claims**




1. A time alignment control system for aligning a plurality of processors in a multiprocessor system comprising:

first means for generating a pseudo time reference;

second means, coupled to said first means, for establishing a respective time window for each processor which time window is based on the master pseudo time reference generated by said master pseudo time generating means to which each processor is coupled;

third means at each processor coupled to said second means for determining whether the time required for each processor to execute an instruction is within said time window, ahead of said time window, or behind said time window;

fourth means, at each processor and coupled to said third means, for idling a processor until the time window catches up with said processor if said processor is ahead of the time window; and

fifth means, at each processor and coupled to said third means, for stopping the master pseudo time generating means if any processor is behind said time window until said processor enters said time window.

**4,392,197**

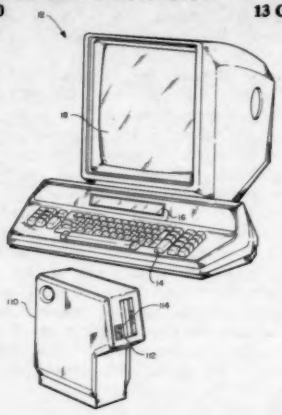
**PRINT CONTROL CIRCUIT FOR A WORD PROCESSING SYSTEM**

**Robert A. Couper, Sunnyvale, and Bruce S. Denning, San Jose, both of Calif., assignors to Pitney Bowes Inc., Stamford, Conn.**

**Filed Aug. 12, 1980, Ser. No. 177,532**

**Int. Cl.³ G06F *3/023, 3/12, 3/14***

**U.S. Cl. 364—200** **13 Claims**



1. A word processing system, comprising:

(a) a data entry station for entering textual and command information into said system;

(b) first memory means coupled to said data entry station for storing said entered textual information in specified locations;

(c) second memory means coupled to said data entry station for storing editing information;

(d) processing means, responsive to said command information, coupled to said data entry station and said first and second memory means for transferring into corresponding locations of said second memory means particular textual information stored in said specified locations of said first memory means when said particular textual information is deleted in response to said command information entered by said data entry station; and,

(e) printing the means for printing textual information stored in said first and said second memory means.

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**4,392,198**

**METHOD OF PRODUCING MICROADDRESSES AND A COMPUTER SYSTEM FOR ACHIEVING THE METHOD**

**Shigeo Shimazaki, Kanagawa, Japan, assignor to Matsushita Electric Industrial Company, Limited, Osaka, Japan**

**Filed Jul. 16, 1980, Ser. No. 169,472**

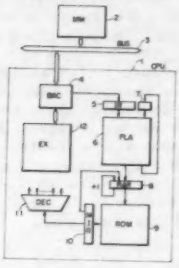
**Claims priority, application Japan, Jul. 18, 1979, 54-91334**

**Int. Cl.³ G06F *9/32***

**U.S. Cl. 364—200** **4 Claims**

1. A method of producing microaddresses in a microprogrammed computer having a main memory and central processing unit, which computer includes a first means for storing a plurality of microprograms each including at least one microinstruction, a second means for producing a selection control signal; and a third means for producing microaddresses of said microprograms in accordance with a machine language instruction and with said selection-control signal, said third means having a plurality of regions each including a plurality of words each including a microaddress as well as the number of a region to be used next for producing a subsequent microaddress, said method comprising the steps of:

(a) fetching a machine language instruction from said main memory;
(b) initializing said selection-control signal;
(c) selecting a microaddress from said third means in accordance with the combination of said machine language instruction and said selection control signal which assumes an initial value, said microaddress being fed to said first means for reading out and executing a corresponding microprogram;
(d) simultaneously with step (c) reading information on the




number of a region to be used next from said third means to change said selection-control signal;
(e) selecting a new microaddress from said third means in accordance with the combination of said machine language instruction and the changed selection control signal, said newly produced microaddress being fed to said first means for reading out and executing a corresponding microprogram; and
(f) repeating said steps of (d) to (e) until the microaddresses of microprograms designated by said machine language instruction are produced.

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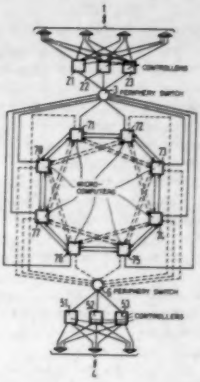
**4,392,199**
**FAULT-TOLERANT SYSTEM EMPLOYING MULTI-MICROCOMPUTERS USING TWO-OUT-OF-THREE MAJORITY DECISION**

**Ernst Schmitter; Paul Birzele; Klaus Buchmann; Gerhard Geitz; Bernhard Will, and Wolfgang Beifuss, all of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Sep. 29, 1980, Ser. No. 191,908**
**Int. Cl.³ G06F *11/18***
**U.S. Cl. 364—200** **6 Claims**

1. A fault-tolerant system incorporating a plurality of microcomputers which can mutually substitute for each other and in which the principle of two-out-of-three decision is employed for control of the task distribution for the microcomputers, comprising:
a partially meshed ring interconnecting said microcomputers;
a plurality of data exchange paths, including data exchange paths between each two adjacent microcomputers in said ring and/or between any microcomputer in said ring and its next-but-one microcomputer;
three device controllers being connected between said ring and a plurality of periphery lines, whereby data transmission errors may be resolved by a two-out-of-three majority decision, each of said device controllers being connected to each of said periphery lines;
a passive periphery switch for connecting all of said device controllers to all of said microcomputers;
a second set of three device controllers being connected between a plurality of user lines and said ring, each of the controllers of said second set being connectable to all of said user lines; and




a second passive periphery switch for interconnecting all of the device controllers of said second set to all of said microcomputers.

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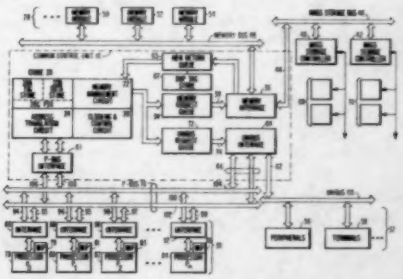
**4,392,200**
**CACHED MULTIPROCESSOR SYSTEM WITH PIPELINE TIMING**

**Jega A. Arulpragasam, Stow, Mass.; Robert A. Giggi, Merrimack, N.H.; Richard F. Lary, Colorado Springs, Colo., and Daniel T. Sullivan, Bolton, Mass., assignors to Digital Equipment Corporation, Maynard, Mass.**

**Continuation-in-part of Ser. No. 116,083, Jan. 28, 1980, Pat. No. 4,345,309. This application Feb. 27, 1981, Ser. No. 239,129**
**Int. Cl.³ G06F *9/10***
**U.S. Cl. 364—200** **13 Claims**



1. A data processing system that provides for the transfer of information among devices in the data processing system wherein the devices issue commands which include data signals and control information, the control information including code signals that specify the type of information transfer operation that is to be performed, device identification signals that identify the device involved in the transfer of information, and address signals that specify a location in the device to which or from which the information is to be transferred, said data processing system comprising:
A. random access memory means (28) for storing information in a plurality of addressable storage locations therein,
B. common control means (10) including
i. pipeline resource means comprising a control section (FIG. 8A) and a data section (FIG. 8B) for processing

commands in an ordered pipeline sequence, said resource means comprising

a. control input means (352) in the control section for receiving control information and data input means (306) in the data section for receiving data signals,

b. associative memory means (20) that includes data store means (20B) having addressable storage locations for storing copies of information contained in said random access memory means, and address tag store means (20A) for storing memory addresses that specify the addressable storage locations in said random access memory means that are associated with the information contained in said data store means,

c. tag compare means (162) for determining whether memory data requested by a command is resident in said associative memory means,

d. queuing means (176) for receiving commands that seek to access said random access memory means, and

e. control output means (163) in the control section for transmitting control information therefrom and data output means (163) in the data section for transmitting data signals therefrom,

ii. memory interface means interconnecting the random access memory means and the common control means comprising

a. command receiving means (196) for receiving commands that read or write information in said random access memory means,

b. memory return means (65) for storing information that is read from or written into said random access memory means, and

c. memory control means (208) connected to said command receiving means and said memory return means for controlling the transfer of information among said random access memory means (184), said command receiving means, and said memory return means (65), and

iii. timing and control means (26) for controlling the operation of said common control means comprising

a. pipeline timing means for sequencing commands through successive stages of said pipeline resource means and being further responsive to said tag compare means for enabling a transfer of data requested by a command from said associative memory means to said control output means when data requested by said command is resident in the associative memory means, and

b. queuing control means (158) responsive to said tag compare means for entering a command in said queuing means (176) when data requested by said command is not resident in said associative memory means, said queuing control means being further responsive to the control information in said command for entering it in said queuing means (176) when the command seeks to write information in said random access memory means.

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**4,392,201**

## DIAGNOSTIC SUBSYSTEM FOR A CACHE MEMORY

**Richard P. Brown, Acton; George J. Barlow, Tewksbury, and Arthur Peters, Sudbury, all of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.**

**Filed Dec. 31, 1980, Ser. No. 221,855**

**Int. Cl.³ G06F** *13/00, 13/06*

**U.S. Cl. 364—200** **12 Claims**

1. In a data processing system including a system memory for addressably storing a plurality of data words identified by a like plurality of associated odd and even address numbers, each of the address numbers including a segment portion and an offset portion, and wherein system elements generate memory requests for the transfer of a pair of data words identified by successive address numbers, each memory request including a memory request address number identifying the first of the pair of data words requested, a cache memory comprising;

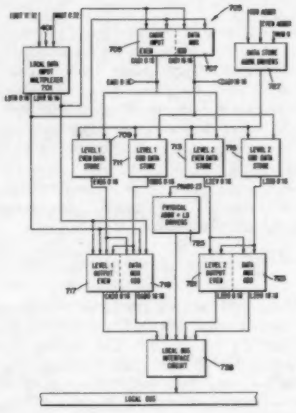
memory means for storing a selected subset of said data words stored in said system memory and for supplying the requested data words to the requesting system elements in the place of the system memory if the requested data words are stored in said memory means, said memory means including an odd memory module for storing said data words identified by said odd address numbers and an even memory module for separately storing said data words identified by said even address numbers;

means for receiving said data words and said associated addresses from said system memory;

cache data input multiplexer means coupled to said receiving means for supplying said received data words to said odd memory module and to said even memory module;

cache address driver means receiving said addresses associated with said received data words and for controlling said cache data input multiplexer means to supply to said odd memory module said transferred data words having associated odd address numbers and to supply to said even memory module said transferred data words having associated even address numbers;

an odd directory memory for storing said address numbers identifying said data words stored in said odd memory module;



an even directory memory for storing said address numbers identifying said data words stored in said even memory module;

means coupled to said odd directory memory and said even directory memory for receiving each of said address numbers supplied by said system elements and for comparing said memory request address number and said next successive address number to said odd address numbers stored in said odd directory memory and said even address numbers stored in said even directory memory to determine if said data words associated with said memory request address number and said next successive address number are stored in said odd or even memory modules;

hit detector circuit means coupled to said receiving and determining means for generating a full hit signal if both said memory request and said next successive address numbers are determined to be stored in said odd and even directory memories, a partial hit signal if only one of said memory request and said next successive address numbers are determined to be stored in said odd and even directory memories, and a no hit signal if neither said memory request nor said next successive address numbers is determined to be stored in said odd and even directory memories; and

diagnostic control means for enabling the testing of operation of said cache memory, said diagnostic control means including means connected to said data input multiplexer for inhibiting the storing of a said data word in said odd memory module or said even memory module and hit detector override means for controlling the generation of said full hit signal, said partial hit signal, and said no hit signal by said hit detector circuit means even when said memory request or said next successive address number is determined to be stored in said odd and even directory memories.

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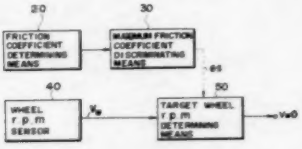
**4,392,202**

## METHOD AND APPARATUS FOR ANTI-SKID BRAKE CONTROL OF AN AUTOMOTIVE VEHICLE

**Toshiro Matsuda, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Kanagawa, Japan**

**Filed Oct. 8, 1980, Ser. No. 195,313**
**Claims priority, application Japan, Oct. 9, 1979, 54-129374**
**Int. Cl.³ B60T *8/08*; G05D *13/02***
**U.S. Cl. 364—426** **15 Claims**




**12.** A brake control system for an automotive vehicle for controlling application and release of brake pressure to a wheel cylinder to prevent a vehicle from skidding, including:

a first means for detecting wheel r.p.m. and for sequentially generating in a plurality of operating cycles a first signal indicative of the detected wheel r.p.m.

a second means for determining a coefficient of friction between a tire tread and a road surface and for generating a second signal indicative of the determined coefficient of friction,

a third means for determining a target wheel r.p.m. and for generating a third signal indicative of the determined target wheel r.p.m.,

a fourth means for controlling application and release of brake pressure to the wheel cylinder operable to release the brake pressure when the value of said first signal drops to be equal to or less than the value of said third signal and

a fifth means for detecting presence of a peak of said second signal in each cycle of skid control operation and for generating a fourth signal;

said third means being responsive to said fourth signal to hold a signal value of said first signal in each cycle of skid control operation for determining a deceleration coefficient of the wheel r.p.m. based on the held values of said first signal generated in the current cycle and in an immediately preceding cycle of skid control operation and further based on an interval between occurrences of said fourth signal, for determining a ramp signal during the next cycle of skid control indicative of deceleration of the target wheel r.p.m. in the next cycle of skid control operation and based on the determined deceleration coefficient, and for determining the target wheel r.p.m. by subtracting the value of said ramp signal from a value of said first signal obtained in response to said fourth signal.

**13.** In an anti-skid brake control system for an automotive vehicle for controlling application and release of brake pressure to a wheel cylinder to prevent a vehicle from skidding, which system includes a first means for detecting wheel r.p.m. and for sequentially generating a first signal indicative of the detected wheel r.p.m., a second means for determining a friction coefficient between a tire tread and a road surface and for generating a second signal indicative of the determined friction coefficient, a third means for determining a target wheel r.p.m. and for generating a third signal indicative of the determined target wheel r.p.m. and a fourth means for controlling application and release of brake pressure to the wheel cylinder operable to release the brake pressure when the value of said first signal drops to be equal to or less than the value of said third signal,

a method for determining the target wheel r.p.m. comprising in combination the steps of:

determining a friction coefficient between a tire tread and a road surface;

discriminating a peak of said friction coefficient in each cycle of skid control operation and generating a peak signal responsive to detection of said peak;

holding a value of said first signal at the time of detection of said peak of said friction coefficient;

measuring an interval between occurrences of said peak signal;

determining a variation of first signal values in each said interval;

dividing said variation by the length of said interval to obtain a deceleration coefficient;

determining a value of a ramp signal based on the obtained deceleration coefficient; and

subtracting said value of said ramp signal from the value of said first signal at the time of detecting said peak of said friction coefficient.

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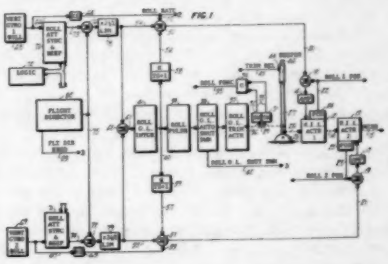
**4,392,203**

## AIRCRAFT COORDINATED TURN WITH LAGGED ROLL RATE

**William C. Fischer, Monroe; Don L. Adams, Fairfield; David J. Verzella, Guilford, and Stuart C. Wright, Milford, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Mar. 30, 1981, Ser. No. 249,273**
**Int. Cl.³ G06F *15/50*; G06G *7/78***
**U.S. Cl. 364—434** **2 Claims**




**1.** A yaw trim channel of an aircraft automatic flight control system that positions the yaw-axis-controlling aerodynamic surfaces of the aircraft, comprising:

rate means for providing a roll rate signal indicative of roll rate of the aircraft;

acceleration means for providing a lateral acceleration signal indicative of lateral acceleration of the aircraft;

yaw trim actuator means responsive to a command input signal thereto for positioning said aerodynamic surfaces; and

signal processing means responsive to said rate means and said acceleration means for providing a yaw command signal to said actuator means in response to a proportional function of said lateral acceleration signal, an integral function of said lateral acceleration signal, and a proportional function of said roll rate signal;

characterized by said signal processing means comprising

means for providing said yaw command signal in response to a lagged function of said roll rate signal.

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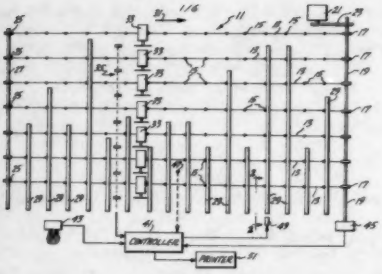
4,392,204

## LUMBER MARKING SYSTEM

David F. Prim, 4503 Mt. View, Yakima, Wash. 98901, and Carl D. Greiff, 1207 N. 23rd Ave., Yakima, Wash. 98902

Filed Dec. 1, 1980, Ser. No. 211,705
Int. Cl.³ G01N 21/22
U.S. Cl. 364—478 13 Claims



1. A lumber marking system for accumulating information about pieces of lumber and marking the lumber with a related code, said lumber marking system comprising:

conveying means for conveying pieces of lumber on a piece-by-piece basis;

an operator's console, located adjacent to said conveyor means, for an operator, observing pieces of lumber conveyed by said conveyor means, to generate operator data signals related to said observations;

dimension means, associated with said conveying means, for determining the dimensions of pieces of lumber conveyed by said conveying means and producing related dimension data signals, said dimension means including length means for determining the length of said pieces of lumber moved by said conveying means and producing related length data signals, said length means including a curtain of length switches, said dimension means also including width means for determining the width of said pieces of lumber moved by said conveyor means and producing related width data signals, said length and width data signals forming said dimension data signals;

accumulating means coupled to said operator's console and said dimension means for accumulating said operator data signals and said dimension data signals for each piece of lumber as said pieces of lumber are moved by said conveyor means, collating said operator data signals and said dimension data signals for each piece of lumber and producing lumber marking control signals in accordance therewith; and

marking means, located adjacent said conveying means, downstream of said operator's console and said dimension means, and coupled to said accumulating means, for receiving said lumber marking control signals and marking said pieces of lumber with a code in accordance with said lumber marking control signals.

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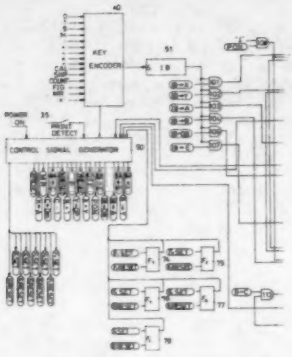
4,392,205

## ELECTRONIC DATA CONTROL IN A NUMBERING MACHINE

Takakazu Makizuka, Nara, and Sunao Katoh, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jan. 23, 1981, Ser. No. 227,986
Claims priority, application Japan, Jan. 24, 1980, 55-7933; Jan. 31, 1980, 55-11823; Feb. 6, 1980, 55-13892; Feb. 6, 1980, 55-13893; Feb. 6, 1980, 55-13894
Int. Cl.³ G06F 3/12
U.S. Cl. 364—518 15 Claims



1. A numbering machine for printing a desired sequence of numbers on a plurality of items comprising:

a digital control system including key input means including numeral keys and function keys;

a control signal generator for developing control signals in response to actuation of said function keys;

a print data memory for storing print data in accordance with said control signals developed by said control signal generator;

a printer unit for printing a sequence of numbers on a plurality of items;

transfer means for transferring said print data stored in said print data memory to said printer unit;

print completion detection means for developing a print completion signal upon completion of each printing operation performed by said printer unit; and

calculation means for varying said print data stored in said print data memory and transferred to said printer unit by a preselected skip number in response to said print completion signal.

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4,392,206

## PRINTER

Graham Neathway, Ottawa; Allan Cramp, Stittsville, and Albert Hum, Nepean, all of Canada, assignors to Mitel Corporation, Ontario, Canada

Filed Mar. 24, 1980, Ser. No. 133,586
Claims priority, application Canada, Oct. 31, 1979, 338908
Int. Cl.³ G06F 11/30
U.S. Cl. 364—900 11 Claims

1. A telephone line monitoring system for connection to a telephone line in which a telephone set is connected comprising:

(a) receiver means for connection to the telephone line, for receiving and translating called subscriber identifying dialed digit signals which may be carried by the telephone line into binary signals,

(b) sensing means connected to the telephone line for sensing and translating the on or off hook status of the telephone line into binary signals,

(c) data bus means for receiving and carrying said binary signals from the sensing means and the receiver means,

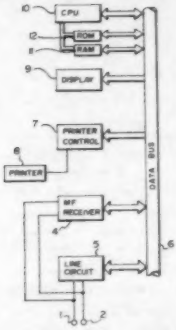
(d) a central processing unit connected to the data bus means for receiving said binary signal, said central processing unit having address terminals,

(e) first random access memory means connected to the data bus means and to said address terminals for storing said binary signals appearing on the data bus,

(f) a printer control circuit connected to the data bus means for operating a printer in response to predetermined forms of binary signals which may appear on the data bus means,

(g) an alphanumeric display connected to the data bus means for displaying alphanumeric symbols in response to at least a portion of said predetermined forms of binary signals which correspond to a predetermined portion of a complete telephone number,

(h) translating means connected to the data bus means and to said address terminals comprising an interconnection matrix for translating binary signals appearing on the data bus from the receiver means and sensing means into signals for controlling the central processing unit for causing it to responsively generate said predetermined forms of binary signals for operating the printer control circuit and the display in accordance with the form of its interconnection matrix, and applying said predetermined forms of binary signals to the data bus means,




(i) said printer control circuit including means for causing the printer to print alphanumeric symbols across a line corresponding to the time and/or said status and/or said dialed digits as said dialed digit and status signals are received by the receiver means and the sensing means from the telephone line, upon receipt of said predetermined forms of said binary signals, wherein the printed alphanumeric symbols are not visible until the paper is advanced, and

(j) further means for causing the alphanumeric display to display said alphanumeric symbols as said dialed digit signals are received by the receiver means upon receipt of said predetermined forms of said binary signals wherein the displaying of the alphanumeric symbols by the alphanumeric display is prior to display thereof by the printer.

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**4,392,207**

## CARD READER-DATA LINK PROCESSOR

**Ronald J. Dockal, San Clemente, Calif., assignor to Burroughs Corporation, Detroit, Mich.**

**Filed Sep. 9, 1980, Ser. No. 185,430**

**Int. Cl.³ G06F 3/04**

**U.S. Cl. 364—900** **9 Claims**

1. A peripheral controller for interfacing a main host computer to a card/reader mechanism which reads information from punched data cards for transmittal to said host computer, said peripheral controller comprising:

(a) common control circuit means including:

(a1) control storage means for storing micro-code word operators, each of said word operators being separately addressable and being selected by control data transmitted via address multiplexor means from a peripheral dependent circuit means;

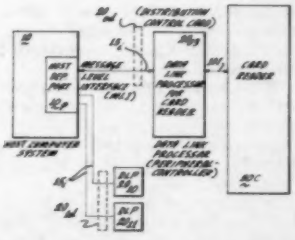
(a2) said address multiplexor means to generate a current address for said control storage means to select a first one of said micro-code word operators, said multiplexor means receiving control data from said peripheral dependent circuit means;

(a3) connection means from said address multiplexor to a stack register to generate the address of the next forthcoming micro-code word operator after completion of a subroutine, said stack register providing an incremented address to said address multiplexor;

(a4) said stack register means for temporarily holding the current address of said first one of said micro-code word operators during subroutine operation and functioning to supply an incremented address to said address multiplexor means, after completion of said subroutine;

(a5) latching register means connected to the output of said control storage means to temporarily store and to convey mirco-code operators to said peripheral depesdent circuit means for execution;

(a6) first connection means carrying output data from a RAM buffer memory storage means and transmitting through said peripheral dependent circuit means via a data communication channel to said main host computer;




(a7) second connection means connected to said latching register means for communicating information to said peripheral dependent circuit means;

(a8) said RAM buffer memory storage means for storing informational data received from said card/reader mechanism and for storing control data from said main host computer, said data being received via said operipheral dependent circuit means, said RAM buffer memory storage means including:

(i) a first dedicated portion of said memory storage means for storing raw untranslated data;

(ii) a second dedicated portion of said memory storage means for storing translated data which has been formatted by a translation means according to commands from said host computer;

(b) said peripheral dependent circuit means including:

(b1) said data communication channel including:

(i) an output bus connection means from said RAM buffer storage means to a first receiving means;

(ii) said first receiving means providing an input to a data multiplexor;

(iii) said data multiplexor functioning to transfer data to a data latch register;

(iv) said data latch register for temporarily storing data for output to a first driver means;

(v) said first driver means for transmitting data to a host-connection means;

(vi) said host connection means providing connection to said host computer;

(b2) op-decoder means receiving control data from said host computer, via said data communication channel, and functioning to provide output signals to said address multiplexor for addressing said control storage means which functions to send control signals to said peripheral dependent circuit means;

(b3) peripheral-receiving means for receiving informational card data from said card/reader mechanism for transfer to said data multiplexor for subsequent transmittal to said first dedicated portion of said RAM buffer memory;

(b4) said output bus connection means including:

a first and second output bus for transmittal of data from said RAM buffer memory storage means, said second output bus for transferring said RAM output data to said translation means, and said first output bus for transferring said RAM output data to said host computer via said data communication channel;

(b5) RAM address register means receiving address data from said control storage means, and functioning to adress memory locations in said RAM buffer;

(b6) said translation means for receiving raw untranslated data from said first dedicated portion of said RAM buffer memory storage means and for translating said raw data into a selected type of translated format for transfer to said second portion of said RAM buffer memory storage means for subsequent transmittal to said host computer.

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**4,392,208**

**DATA PROCESSING SYSTEM AND DIAGNOSTIC UNIT**

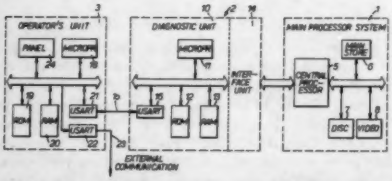
**James E. Burrows, Stoke on Trent, and Ivan R. Greenaway, Brierley Hill, both of England, assignors to International Computers Limited, London, England**

**Filed Mar. 18, 1981, Ser. No. 244,864**

**Claims priority, application United Kingdom, Mar. 19, 1980, 8009306**

**Int. Cl.³ G06F *9/06, 11/04***

**U.S. Cl. 364—900** **7 Claims**




1. A data processing system comprising: a main processor system including a central processor having a writable control store, the operation of the central processor being controlled by a microprogram held in the control store; and diagnostic apparatus connected to receive signals indicative of occurrences in the central processor, the diagnostic apparatus comprising:

(a) first means coupled to the central processor for producing a first signal whenever the central processor accesses a predetermined location in the control store;

(b) second means coupled to the central processor for producing a second signal whenever the central processor writes to the control store;

(c) logic means responsive to the first and second signals for producing an output signal whenever both the first and second signals are present, indicating that the central processor has made a write access to said predetermined location; and

(d) means coupled to the control store and responsive to said output signal for reading out information held in said predetermined location and transferring the information to the diagnostic apparatus.

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**4,392,209**

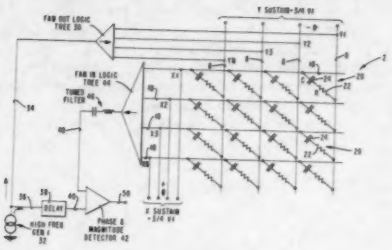
**RANDOMLY ACCESSIBLE MEMORY DISPLAY**

**David E. DeBar, Manassas, Va., assignor to IBM Corporation, Armonk, N.Y.**

**Filed Mar. 31, 1981, Ser. No. 249,555**

**Int. Cl.³ G11C *13/08***

**U.S. Cl. 365—110** **2 Claims**




1. A randomly accessible memory display including an electroluminescent panel laminate having a first layer including a plurality of horizontal X electrodes and a second layer including a plurality of vertical Y electrodes, between said first and second layers there being a layer of electroluminescent material, and a layer of photoresistive material, said panel emitting light at a cell location when the potential difference between juxtaposed X and Y electrodes exceeds a sustaining voltage, each said cell forming a memory element with a first terminal series-connected with a Y-sustaining AC voltage and a Y electrode, and a second terminal series-connected with an X-sustaining AC voltage and an X electrode, the sum of the peak voltage for said X-sustaining AC voltage and said Y-sustaining AC voltage being greater than said sustaining voltage, wherein the improvement comprises:

a high frequency sinusoidal voltage generator selectively connected to one of said Y electrodes for providing a sinusoidal interrogation signal;

a phase detector having a first input connected to said high frequency sinusoidal voltage generator and a second input selectively connected to a corresponding one of said X electrodes;

said phase detector indicating an alteration in the phase of said high frequency sinusoidal interrogation signal after transmission through a selected one of said cells in response to the altered conductivity of the corresponding portion of said photoresistive layer due to the light-emitting state of said selected cell;

whereby the stored light-emitting state of a plurality of said cells on said electroluminescent panel can be accessed.

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**4,392,210**

**ONE TRANSISTOR-ONE CAPACITOR MEMORY CELL**

**Tsiu C. Chan, Carrollton, Tex., assignor to Mostek Corporation, Carrollton, Tex.**

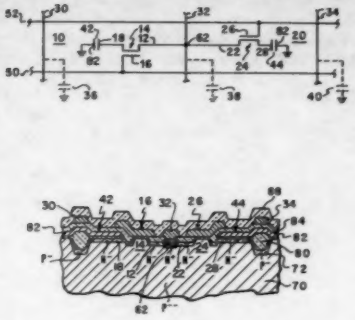
**Filed Aug. 28, 1978, Ser. No. 937,272**

**Int. Cl.³ G11C *11/24***

**U.S. Cl. 365—149** **5 Claims**

1. In an integrated circuit memory of the type including an array of memory cells fabricated on a semiconductor substrate, each cell including a gate-controlled switch and a charge storage capacitor coupled to said switch, wherein one plate of each charge storage capacitor is formed by a conductive region within said substrate, the improvement comprising a

conductive sheet overlying the cells of the array and insulated with respect to each conductive substrate region, said conductive sheet defining a common plate for each capacitor in the array.



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**4,392,211**

## SEMICONDUCTOR MEMORY DEVICE TECHNICAL FIELD

**Masao Nakano, Kawasaki; Fumio Baba, Yokohama; Tomio Nakano, Kawasaki; Yoshihiro Takemae, Yokohama, and Hirohiko Mochizuki, Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

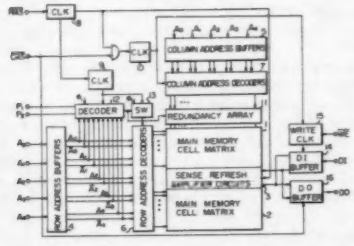
**PCT No. PCT/JP80/00143, § 371 Date Feb. 25, 1981, § 102(e) Date Feb. 20, 1981, PCT Pub. No. WO81/00027, PCT Pub. Date Jan. 8, 1981**

**PCT Filed Jun. 24, 1980, Ser. No. 243,927**

**Claims priority, application Japan, Jun. 25, 1979, 54-79819**

**Int. Cl.³ G11C *7/00***

**U.S. Cl. 365—200** **7 Claims**



**1. A semiconductor memory device comprising:**

**a main memory cell matrix;**

**a redundancy memory cell array which is incorporated with said main memory cell matrix;**

**a first decoder means for selecting one memory cell array parallel to said redundancy memory cell array within said main memory cell matrix, in accordance with a first address information;**

**a second decoder means for selecting said redundancy memory cell array when said first address information corresponds to a memory cell array having a defective cell therein;**

**a switching means for stopping the transmission of a clock signal for operating said first decoder means when said first address information corresponds to said memory cell array having a defective cell therein and said second decoder means selects said redundancy memory cell array; and**

**a third decoder means for selecting one memory cell array perpendicular to said redundancy memory cell array, within said main memory cell matrix and said redundancy memory cell array, in accordance with a second address information.**

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**4,392,212**

## SEMICONDUCTOR MEMORY DEVICE WITH DECODER FOR CHIP SELECTION/WRITE IN

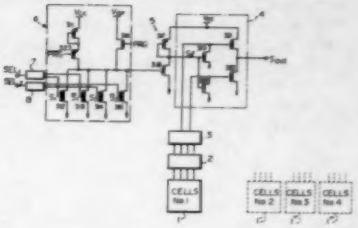
**Kiyoshi Miyasaka, Yokohama, and Mitsuo Higuchi, Tokyo, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan**

**Filed Nov. 12, 1980, Ser. No. 206,131**

**Claims priority, application Japan, Nov. 12, 1979, 54-146346**

**Int. Cl.³ G11C *8/00***

**U.S. Cl. 365—230** **12 Claims**



**1. A semiconductor memory device for receiving a plurality of external selection signals in which a semiconductor memory chip of said device is selected in accordance with a predetermined combination of the external selection signals, said device comprising:**

**a semiconductor memory chip; and**

**a decoder circuit for receiving said external selection signals and provided in said semiconductor memory device, said decoder circuit selecting said semiconductor memory chip in accordance with a logic corresponding to the predetermined combination of said external selection signals, said logic capable of being changed by the user of said semiconductor memory device.**

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**4,392,213**

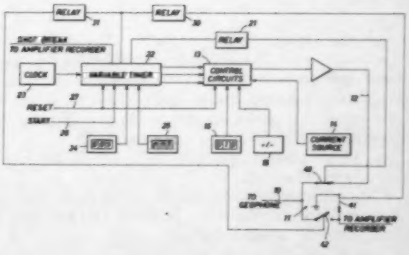
## CURRENT IMPULSE METHOD AND APPARATUS FOR TESTING GEOPHONE STRINGS

**Edward J. Kiing, Calgary, Canada, and Eugene D. Bednard, Houston, Tex., assignors to Shell Oil Company, Houston, Tex.**

**Filed Jul. 11, 1980, Ser. No. 168,956**

**Int. Cl.³ G01V *1/16***

**U.S. Cl. 367—13** **6 Claims**



**5. An apparatus for obtaining data from which the time equivalent of the velocity response of a string of geophones and their associated acquisition system may be determined, said apparatus comprising:**

an adjustable current source, said source being adjusted to lift said geophones to a position intermediate their stops;
a clock circuit, said clock circuit supplying a constant frequency signal;
a variable timer, said timer being responsive to said clock to supply a plurality of timed output signals;
a first switch means responsive to one of the signals from said timer for coupling said current source to said geophones, said one signal having a duration sufficiently long to permit said geophones to reach a steady state condition;
a second switch means responsive to a second signal from said timer for coupling said acquisition system to said geophones after said current source is decoupled from said geophones; and
a third switch means responsive to a third signal from said timer for grounding said acquisition system prior to decoupling said current source and removing said ground prior to said geophones being coupled to said acquisition system.

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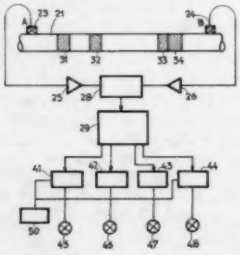
**4,392,214**

## SOUND-MONITORING DEVICE FOR AN INDUSTRIAL INSTALLATION

**Jean Marini, Marly le Roi, and Bernard Audenard, Orgeval, both of France, assignors to Framatome, Courbevoie, France**

**Filed Feb. 17, 1981, Ser. No. 235,226**
**Claims priority, application France, Feb. 12, 1980, 80 03090**
**Int. Cl.³ G01S *5/18*; G21C *17/00***
**U.S. Cl. 367—127** **1 Claim**



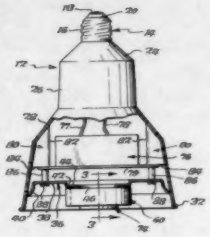
1. Sound monitoring device for detecting possible impacts of stray bodies in an industrial installation, using sound sensors for waves emitted on impacts of said stray bodies and comprising
(a) first and second acoustic sensors arranged adjacent to the wall of said installation at two different points the interval between which is to be monitored; and
(b) a measuring and alarm circuit to which said sensors are connected, comprising
(i) means for measuring the separation in time between the reception of the sound waves at said first and second sensors, respectively; and
(ii) means for comparing said separation with at at least two sets of two predetermined values corresponding to the ends of at least two monitoring zones; and
(iii) alarm means which is triggered if said separation in time falls between two predetermined values corresponding to one of said monitoring zones.

**4,392,215**

## PEST CONTROL APPARATUS

**Lester B. Hall, Kenmore, N.Y., assignor to Gary Lester Hall, Kenmore, N.Y.**

**Continuation-in-part of Ser. No. 840,536, Oct. 11, 1977, Pat. No. 4,178,578. This application Mar. 17, 1978, Ser. No. 887,601**
**Int. Cl.³ H04B *1/02***
**U.S. Cl. 367—139** **9 Claims**



1. Apparatus for generating and radiating ultrasonic sound waves for the control of pests comprising:
(a) an elongated housing having two ends;
(b) sound generating means carried by said housing adjacent one end thereof; said sound generating means comprising transducer means having a natural frequency of oscillation for providing sound waves when driven by an electrical signal, said sound waves being in a frequency range normally inaudible to humans and intolerable by pests such as rodents and the like, said sound generating means including driver means operatively connected to said transducer means for applying to said transducer means an electrical signal having a frequency different from the natural frequency of said transducer means thereby causing said transducer means to provide said output sound waves in a varying pattern of frequencies with amplitude peaking;
(c) said sound generating means being positioned to direct said output sound waves outwardly away from said one end of said housing;
(d) an electrical connector fixed to the other end of said housing and integral with said housing adapted to be inserted manually in a standard electrical outlet receptacle commonly found in buildings and the like, said connector comprising first and second portions of electrically conductive material on said end of said housing and separated by insulative material, there being mechanical engagement between said connector and the outlet receptacle to mechanically support said housing in the outlet;
(e) first and second electrical conductor means for connecting said first and second portions, respectively, of said connector electrically to said sound generating means; and
(f) said connector when inserted in an outlet providing for supply of electric current to said sound generating means and simultaneously providing for mechanical support for said housing.

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**4,392,216**

## INTEGRATED CIRCUIT FOR TIMEPIECE

**Masuo Tsuji, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan**

**Filed Dec. 24, 1980, Ser. No. 219,747**
**Claims priority, application Japan, Dec. 26, 1979, 54-173312; Sep. 17, 1980, 55-128794**
**Int. Cl.³ G04B *25/00*, *1/00***
**U.S. Cl. 368—71** **6 Claims**

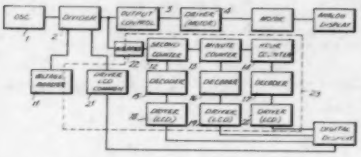
1. A circuit for a hybrid timepiece, said timepiece comprising:
timekeeping circuit means including oscillator means for generating a high frequency standard signal, divider means for dividing down said high frequency standard

signal to a lower frequency timekeeping signal, controller means for shaping signals from said divider means;

an external power supply for powering a portion of the circuits of said hybrid timepiece;

booster circuit means operating from said power supply for outputting a boosted voltage at a level exceeding the voltage of said power supply, another portion of circuits of said timepiece operating on said boosted voltage;

a liquid crystal display and means for driving said liquid crystal display, said means for driving said liquid crystal display operating on said boosted voltage in response to said lower frequency timekeeping signal;



a step motor driving an analog display;

integrated circuit means for providing driving current pulses to said step motor in response to said shaped signals from said divider means, said integrated circuit means for providing driving current pulses to said step motor including at least one CMOS transistor pair, the source and drain terminals of said at least one CMOS transistor pair operating on said power supply voltage, the gates of said at least one CMOS transistor pair being driven by signals at said boosted voltage level.

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**4,392,217**

## DEVICE FOR CONTROLLING CORRECTION OPERATIONS OF A TIME DISPLAY DEVICE

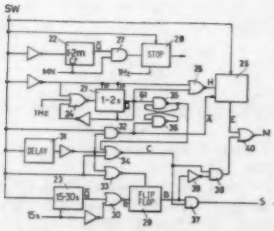
**Niraj Kumar, Indialantic, Fla., and Marc Mouthon, Cornaux, Switzerland, assignors to Ebauches Electroniques, S.A., Switzerland**

**Filed Feb. 17, 1981, Ser. No. 234,459**

**Claims priority, application Switzerland, Feb. 18, 1980, 1291/80**

**Int. Cl.³ G04C *9/00***

**U.S. Cl. 368—188** **3 Claims**



1. A device for controlling correction operations of a time display device showing hours and minutes comprising a control button and means for distinguishing a short depression from a long depression, depending on the period of actuation of the control button, means for selecting in the case of a short depression a minutes correction mode in which the display advances by one minute for each depression and, in the case of a long depression, an hours correction mode in which the display advances by complete hours as long as the depressions last, and means for defining two different advance speeds, a slower speed and a faster speed, in the hours correction mode, and means for passing automatically firstly to the slow speed to advance a first hour and then to the fast speed for the following hours.

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**4,392,218**

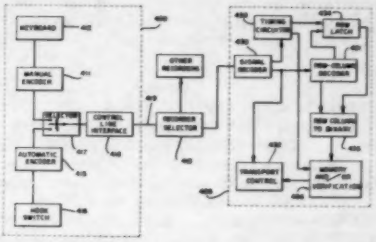
## APPARATUS FOR IDENTIFYING A DICTATE STATION BY PROVIDING AN AUTOMATICALLY GENERATED SEQUENCE OF SIGNALS AND A MANUALLY ENTERED SEQUENCE OF SIGNALS

**Luther C. Plunkett, Jr., Atlanta, Ga., assignor to Lanier Business Products, Inc., Atlanta, Ga.**

**Division of Ser. No. 352, Jan. 2, 1979, Pat. No. 4,254,307. This application Oct. 14, 1980, Ser. No. 196,461**

**Int. Cl.³ G11B *19/02, 19/16***

**U.S. Cl. 369—29** **3 Claims**



1. In a dictation recording system including a dictate station, and a recorder selectively operable by said dictate station for the recording of dictation; the improvement of

a first signal means at said dictate station for automatically generating a predetermined sequence of first signals comprising a first predetermined number of said first signals;

a second signal means at said dictate station selectively operable by an operator for generating a second predetermined number of second signals as a second sequence of second signals;

identification means associated with said dictate station for providing a sequence of identification signals in response to said predetermined sequence of said first signals and said second sequence of said second signals; said sequence of identification signals comprising a third predetermined number of said identification signals, said third predetermined number being equal to the sum of said first and second predetermined numbers;

switching means at said recorder responsive to said sequence of identification signals for providing a transport enable signal in response to receipt of said third predetermined number of said identification signals; and

operating means at said recorder responsive to said transport enable signal for rendering said recorder operable by said dictate station.

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**4,392,219**

## METHOD AND DEVICE FOR RECORDING AND REPRODUCING TRACKING INFORMATION

**Norio Yokozawa, Fuchu; Wasao Takasugi, Higashiyamato; Seiji Yonezawa, Hachioji, and Kiichi Ueyanagi, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Continuation of Ser. No. 43,749, May 30, 1979, abandoned. This application Apr. 9, 1981, Ser. No. 252,593**

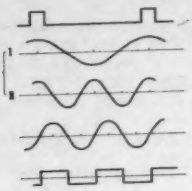
**Claims priority, application Japan, Jun. 9, 1978, 53-68793**

**Int. Cl.³ G11B *21/10***

**U.S. Cl. 369—44** **10 Claims**

1. A method for recording and reproducing an information train in which synchronizing signals are arrayed at predetermined time intervals between the information to be reproduced, comprising the steps of recording said information train in an information track on a recording medium; while recording, wobbling said information track at a frequency which is an

integral number of times the recurrence frequency of said synchronizing signals and is different in phase by 90° from a harmonic component of said synchronizing signals; reading



out by means of read-out means said information train recorded in said information track; and controlling the position of said read-out means relative to said information track on the basis of the information train read out.

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**4,392,220**

## MODEM TO BE COUPLED TO A DIRECTIONAL TRANSMISSION LINE OF AN SS MULTIPLEX COMMUNICATION NETWORK

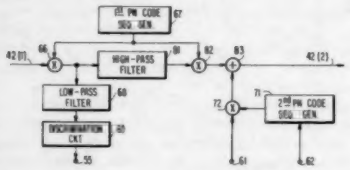
**Botaro Hirosaki, and Satoshi Hasegawa, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan**

**Filed May 15, 1981, Ser. No. 264,163**

**Claims priority, application Japan, May 30, 1980, 55-72352; Jun. 3, 1980, 55-74468; Jun. 3, 1980, 55-74469; Jun. 3, 1980, 55-74470; Nov. 21, 1980, 55-164344; Feb. 3, 1981, 56-14884; Feb. 3, 1981, 56-14885**

**Int. Cl.³ H03K** *13/01;* **H04J** *11/00, 13/00*

**U.S. Cl. 370—18** **26 Claims**




1. A transmitter-receiver for use in a spread spectrum multiplex communication network comprising a directional transmission line and a plurality of modems coupled to said transmission line, said transmitter-receiver being comprised by each of said modems to be responsive to a first spread spectrum signal received from said transmission line and comprising a spread spectrum signal into which a first of a plurality of different pseudo noise code sequences is modulated by a particular information signal for reproducing said particular information signal and to be responsive to a transmission information signal for supplying said transmission line with a second spread spectrum signal comprising a spread spectrum signal into which a second of said pseudo noise code sequences is modulated by said transmission information signal, said transmitter-receiver including reception spread spectrum signal producing means responsive to said first spread spectrum signal for producing a reception spread spectrum signal, pseudo noise code sequence generating means for generating at least one of said different pseudo noise code sequences as said first and said second pseudo noise code sequences, first multiplying means for multiplying said reception spread spectrum signal by the first pseudo noise code sequence generated by said pseudo noise code sequence generating means to produce a first multiplied signal, low frequency component extracting means for extracting a low frequency component from said first multiplied signal to produce a low frequency signal, means responsive to said low frequency signal for producing said particular information signal, second multiplying means for multiplying an input signal by the second pseudo noise code sequence generated by said pseudo noise code sequence generating means to produce a second multiplied signal, transmission information signal supplying means for supplying said transmission information signal to said second multiplying means as said input signal, and means responsive to a transmission spread spectrum signal for producing said second spread spectrum signal, wherein the improvement comprises combining means for combining said first and said second multiplied signals into said transmission spread spectrum signal with said low frequency component rejected from said first multiplied signal.

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**4,392,221**

## TIME DIVISION MULTIPLEX MODULE FOR USE IN DIGITAL SWITCHING NETWORK

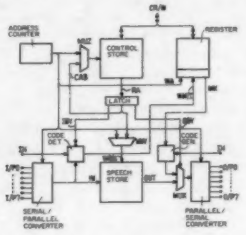
**Truman H. Hesketh, Maidenhead, England, assignor to Plessey Overseas Limited, Ilford, England**

**Filed Sep. 5, 1980, Ser. No. 184,367**

**Claims priority, application United Kingdom, Sep. 8, 1979, 7931231**

**Int. Cl.³ H04Q** *11/04*

**U.S. Cl. 370—54** **7 Claims**




1. A time-division multiplex switching module for use in a multi-stage digital network, the module comprising a plurality of inlet multiplex paths and a plurality of outlet multiplex paths, a plurality of register means, one for each multiplex input path respectively, a code detector means for detecting the presence of a mark code on the inlet multiplex paths, and code generator means for generating either an idle code or a mark code, in which, when a mark code is detected by the code detector on a particular inlet multiplex path, a mark present bit is set in the register means appropriate to the particular inlet path, whereupon the code generator generates mark codes which are then transmitted on all free outlets of the module.

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**4,392,222**

## COMBINED CIRCUIT AND PACKET SWITCHED SYSTEM

**Sumitoshi Ando, Tokyo, Japan, assignor to Kokusai Denshin Denwa Co., Ltd., Japan**

**Filed Jan. 15, 1981, Ser. No. 225,205**

**Claims priority, application Japan, Jan. 28, 1980, 55-7744**

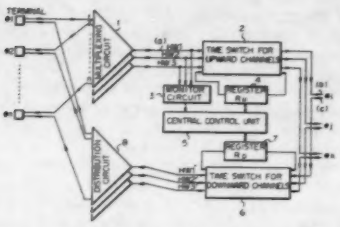
**Int. Cl.³ H04J** *3/12*

**U.S. Cl. 370—60** **3 Claims**

1. A combined circuit and packet switching system coupled with a plurality of terminals and trunk lines for connecting each of said terminals to one of the trunk lines with efficient use of the trunk lines, each of said terminals generating a relatively large amount of information continuously in a forward direction from the terminal to the switching system and a relatively small amount of control information relating to said relatively large amount of information in a backward direction from the switching system to

(a) a fixed circuit is assigned in one of said trunk lines for forward information generated by said terminal through a circuit exchange technique; and

(b) a transmission channel for transmitting said control information is provided by packet switching technique




wherein plural calls in the backward direction share a single trunk line simultaneously.

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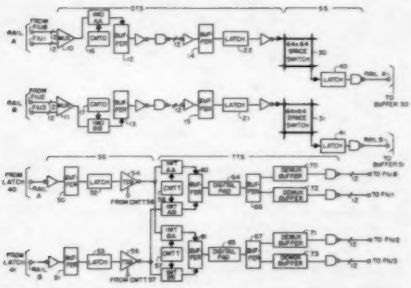
**4,392,223**

## DUAL RAIL TIME AND CONTROL UNIT FOR A T-S-T-DIGITAL SWITCHING SYSTEM

**Nathaniel Simmons; Stig Magnusson, both of Phoenix; Sergio E. Puccini, Scottsdale, all of Ariz.; Donald W. McLaughlin, Naperville, and David J. Stelte, Lombard, both of Ill., assignors to GTE Automatic Electric Laboratories, Inc., Northlake, Ill.**

**Filed Dec. 23, 1980, Ser. No. 219,464**
**Int. Cl.³ H04J *3/00***
**U.S. Cl. 370—63** **10 Claims**



1. In a time-space-time switching system including first and a second buses, each bus transmitting a plurality of PCM voice samples to a switching network, said buses connected between said network and subscriber interface equipment, said switching network comprising:

first and second space switching means;

first and second originating time switching means, each of said originating time switching means being operated to switch said PCM voice samples from said subscriber interface equipment, said first and second originating time switching means being connected respectively between said first and second space switching means and said subscriber interface equipment via said first and second buses;

each of said originating time switching means including:

first and second memory means connected to each of said first and second buses, said first and said second memory means being interconnected so that said first and said second memory means are written into simultaneously in sequential time slots with said PCM samples transmitted via said buses;

said first and said second memory means further being operated so that said PCM samples transmitted on said first bus may be switched to said second space switching means for subsequent retransmission and alternatively said PCM samples transmitted on said second bus may be switched to said first space switching means for subsequent retransmission;

first and second terminating time switching means being connected respectively between said first and said second space switching means and said subscriber interface equipment, said first and second terminating time switching means respectively operated to switch said PCM voice samples from said first and second space switching means to said subscriber interface equipment for transmission to a telephone subscriber;

each of said terminating time switching means including:

first and second memory means connected between each of said first and second space switching means and said subscriber interface equipment, said first and said second memory means being interconnected so that said first and said second memory means are written into simultaneously in corresponding time slots for storing said PCM samples transmitted from said space switching means;

a plurality of buses connected between each of said memory means of said terminating time switching means and said subscriber interface equipment for transmitting said PCM samples to said subscriber interface equipment;

gating means connected respectively between said first and second space switching means and interconnected to each of said memory means of said first and second terminating time switching means, each of said gating means being operated in response to said memory means of said terminating time switching means to transmit said PCM samples from said first and second space switching means to said first and second memory means for each of said plurality of PCM samples; and

said first and said second memory means further being capable of being operated to switch said PCM samples from said first space switching means through said second terminating time switching means to said telephone subscriber and alternatively being capable of being operated to switch said PCM samples from said second space switching means through said first terminating time switching means to said telephone subscriber.

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**4,392,224**

## SPEECH PATH SWITCHING SYSTEM IN TIME-DIVISIONAL ELECTRONIC TELEPHONE SWITCHING SYSTEM

**Hiromichi Mori, Kawasaki; Jun Matsumoto, Tama, and Masanobu Fujioka, Tokyo, all of Japan, assignors to Kokusai Denshin Denwa Co., Ltd., Tokyo, Japan**

**Filed Aug. 12, 1980, Ser. No. 177,454**
**Claims priority, application Japan, Aug. 21, 1979, 54-105520**
**Int. Cl.³ H04Q *11/04***
**U.S. Cl. 370—67** **1 Claim**

1. A speech path switching system in a time divisional electronic telephone switching system for full availability switching between an incoming channel in a plurality of incoming highways and an outgoing channel in a plurality of outgoing highways comprising:

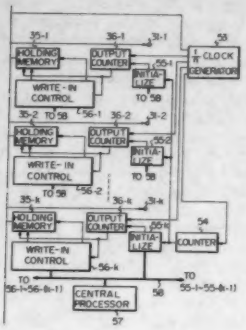
a plurality of speech path memories each coupled with a related incoming highway for temporarily storing the telephone signals to be switched;

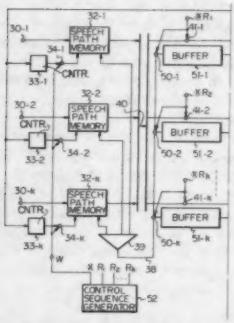
each of said speech path memories having a related input counter for designating the address of a speech path memory, said input counter being incremented in synchronism with the frame phase of the corresponding incoming highway, the received information on an incoming highway being stored in an address designated by the instantaneous content of the input counter in the corresponding speech path memory;

a plurality of holding memories, each operable to designate the read out address of a speech path memory to effectively connect an incoming channel to a selected outgoing channel;

a holding memory being provided for each related outgoing highway, each holding memory having a corresponding

output counter for designating the read out address of the holding memory;




the circulation phase of each output counter being independently adjustable, the frame phase of each outgoing highway being independent from the other outgoing highways by adjusting each output counter independently.

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**4,392,225**

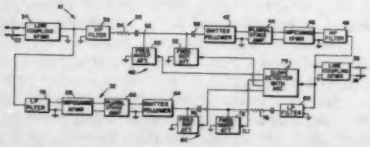
**TELEPHONE CARRIER SYSTEM REPEATER AND POWER SUPPLY**

**Donald W. Wortman, Central Islip, N.Y., assignor to TII Corporation, Lindenhurst, N.Y.**

**Filed Feb. 17, 1981, Ser. No. 234,725**

**Int. Cl.³ H04J *1/10***

**U.S. Cl. 370—75** **7 Claims**



**1. A signal-amplifying telephone carrier repeater adapted to be connected to a two-conductor transmission line in a plural channel amplitude modulated telephone carrier system in which said transmission line has a preselected cable gauge and is connected to transmit a plurality of first frequency division multiplexed carrier signals in one direction from a signal source to the telephone carrier repeater and to transmit a plurality of second frequency division multiplexed carrier signals in the opposite direction from the telephone carrier repeater to a termination, said signal-amplifying telephone carrier repeater comprising first means responsive only to a first preselected one of said first carrier signals following its transmission over said line for producing a first d.c. control signal whose magnitude varies as a function of the level of just said first preselected one of said first carrier signals, second means responsive only to a second preselected one of said first carrier signals following its transmission over said line for producing a second d.c. control signal whose magnitude varies as a function of the level of just said second preselected one of said first carrier signals, said first and second preselected ones of the first carrier signals having different frequencies, and further means under the control of said d.c. control signals for automatically adjusting the level of each of said second carrier signals as a function of the cable gauge of said transmission line and the length of said transmission line between said source and said repeater to compensate for both the length and the cable gauge of said transmission line.**

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**4,392,226**

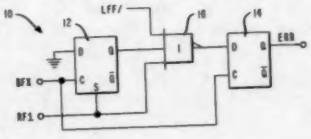
**MULTIPLE SOURCE CLOCK ENCODED COMMUNICATIONS ERROR DETECTION CIRCUIT**

**Donald M. Cook, Poway, Calif., assignor to NCR Corporation, Dayton, Ohio**

**Filed Sep. 28, 1981, Ser. No. 306,118**

**Int. Cl.³ G06F *11/00***

**U.S. Cl. 371—61** **6 Claims**




**1. A circuit for detecting an error in a clock signal recovered from a digital data signal comprising:**

**(a) means for detecting a transition in the voltage level of the clock signal, said means comprising first switch means clocked at a clock rate equal to that of said recovered clock signal to provide a transition signal indicating whether said transition has occurred;**

**(b) gating means to combine an output signal from the clocked switch means with selected parts of said data signal; and**

**(c) second switch means clocked at said clock rate and connected to the output of the gating means for sensing the output signal therefrom to provide an error signal if no transition has occurred within a predetermined time period.**

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**4,392,227**

**TERRACED SUBSTRATE SEMICONDUCTOR LASER**

**Kunio Itoh, Uji; Takashi Sugino; Masaru Wada, both of Takatsuki, and Hirokazu Shimizu, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed Jan. 13, 1981, Ser. No. 224,821**

**Claims priority, application Japan, Jan. 14, 1980, 55-2777; Feb. 5, 1980, 55-13159; Feb. 19, 1980, 55-20256; Mar. 14, 1980, 55-32981; Mar. 19, 1980, 55-35292; Mar. 19, 1980, 55-35293; Mar. 19, 1980, 55-35296; May 16, 1980, 55-65555**

**Int. Cl.³ H01S *3/19***

**U.S. Cl. 372—46** **15 Claims**

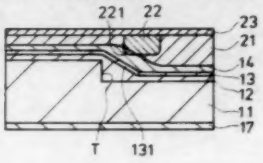
**1. In a semiconductor laser:**

**a terraced-shaped semiconductor substrate having a thinner part and a thicker part with a step inbetween,**

**a first clad layer which is formed on said substrate and has a lower part formed on said thinner part, an upper part formed on said thicker part and a central part formed to**

connect said lower part and said upper part, having an oblique upper face with respect to the principal face of said substrate and having a larger thickness than those of said lower part and said upper part,

an active layer formed on said first clad layer and having a horizontal lower part formed on said lower part of said first clad layer, a horizontal upper part formed on said upper part of said first clad layer and an oblique central region as a lasing region formed on said central part of




said first clad layer and connecting said horizontal lower part and said horizontal upper part therewith with a lower bending and an upper bending inbetween, and

a second clad layer formed on said active layer, characterized in that

a current injection region of a stripe-shaped pattern is formed penetrating said second clad layer to contact the latter at a part above said oblique central region of said active layer, and to form an ohmic junction with a width smaller than a width of said oblique central region.

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**4,392,228**

**TERRACED SUBSTRATE SEMICONDUCTOR LASER**

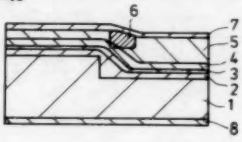
**Takako Okabe, Kusatsu; Kunio Itoh, Uji, and Takashi Sugino, Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan**

**Filed May 11, 1981, Ser. No. 262,773**

**Claims priority, application Japan, May 16, 1980, 55-65554**

**Int. Cl.³ H01S 3/19**

**U.S. Cl. 372—46** **10 Claims**




1. In a semiconductor laser:

a terraced semiconductor substrate (9) which has a thicker part and a thinner part with a step inbetween,

semiconductor layers (10, 11, 12) including an active layer (11) formed on said terraced semiconductor substrate (9) in a manner to have an inclined part (111) ranging from the position above said step to the part shifted to the side of said thinner part,

an overriding layer (13) having the opposite conductivity type to that of the uppermost layer (12) of said semiconductor layers (10, 11, 12) and formed on said uppermost layer (12),

characterized by further comprising:

a last layer (14) having the same conductivity type to that of the overriding layer (13) formed on the latter layer (13),

said last layer (14) having a stripe-shaped through-opening (141) at the position which is a shifted position from the part immediately above said inclined part (111), thereby exposing a surface of said overriding layer (13) at the bottom of the through-opening (141),

a conduction region (15) formed at least on the bottom and side faces of said stripe-shaped opening, in a manner to reach and contact said uppermost layer (12),

a first electrode layer formed to contact to said conduction layer in said through-opening and

a second electrode formed on the bottom face of said terraced semiconductor substrate.

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**4,392,229**

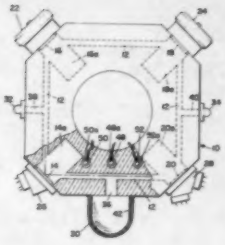
**RING LASER WITH PLASMA STARTER**

**James W. Hostetler, Thousand Oaks, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.**

**Filed Dec. 15, 1980, Ser. No. 216,543**

**Int. Cl.³ H01S 3/08**

**U.S. Cl. 372—94** **7 Claims**



1. In combination:

a ring laser, including a resonant cavity enclosing laser gas, at least one cathode and at least one anode attached to said ring laser for energizing gain sections of said ring laser when a voltage is connected between said cathodes and anodes; and

an illumination source illuminating the surfaces of at least one of said cathodes such that the intensity and spectrum of the illumination is sufficient to produce photoemission from at least one of said cathodes.

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**4,392,230**

**METHOD AND APPARATUS FOR THE MANUFACTURE OF SILICON BY CRUCIBLE-FREE ZONE MELTING**

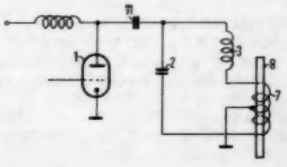
**Wolfgang Keller, Munich; Hans-Christian Grassmann, Igelsdorf, and Karl Schmidt, Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Filed Sep. 10, 1980, Ser. No. 185,752**

**Claims priority, application Fed. Rep. of Germany, Sep. 21, 1979, 2938348**

**Int. Cl.³ B01J 7/10**

**U.S. Cl. 373—139** **7 Claims**




1. Method of producing silicon by crucible-free zone melting a substantially vertically held silicon rod with which a melting zone, produced by an induction heating coil which, together with an oscillating-circuit coil connected in series therewith and determining the oscillating-circuit frequency and having a high inductance in comparison with that of the induction heating coil heating up the rod material, forms the inductive component of a heating parallel oscillating circuit fed by a high-frequency generator and has a heating circuit capacitor

connected in parallel with the heating coil, is passed through the silicon rod in direction of the rod axis, which comprises dimensioning the component resonance circuit formed by the induction heating coil and the heating-circuit capacitor to a frequency deviating by less than a factor of 2 from the frequency of the high-frequency generator.

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**4,392,231**

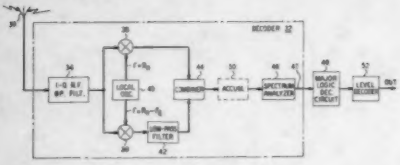
**SPREAD SPECTRUM FH-MFSK DECODER**

**Paul S. Henry, Holmdel, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.**

**Continuation-in-part of Ser. No. 164,160, Jun. 30, 1980, abandoned. This application Jul. 1, 1981, Ser. No. 279,472**

**Int. Cl.³ H03K *13/01***

**U.S. Cl. 375—80** **6 Claims**



4. A method of decoding one of one or more concurrently received L-length frequency-hopped, Q-level frequency shift keyed input signals, each input signal being originally formed by modulating a particular user's L-length frequency-hopping address sequence with the particular user's message signal encoded as one of Q possible frequencies, where Q is an integer characterized in that

the method comprises the steps of:

(a) mixing the frequencies of the particular user's frequency-hopping address sequence which are in the same band of Q frequencies as the input signal with the frequencies in the received input signal which are equal to or above the corresponding address sequence frequencies in each L-length sequence for generating a resultant signal comprising difference frequencies within Q baseband frequency levels;

(b) concurrent with step (a) mixing the frequencies of the particular user's frequency-hopping address sequence which are in the next lower band of Q frequencies than the input signal with the frequencies in the received input signal for generating difference frequencies within the Q baseband frequency levels of step (a); and

(c) combining the resultant signals generated in steps (a) and (b) for generating a demodulated and decoded output signal.

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**4,392,232**

**SIMPLIFIED TRANSVERSAL CORRELATOR FOR MSK AND MSK RELATED WAVEFORMS**

**Carl F. Andren, Indiatlantic, and William H. Mosley, Jr., St. Petersburg, both of Fla., assignors to B-Systems, Inc., Dallas, Tex.**

**Filed Sep. 28, 1981, Ser. No. 306,490**

**Int. Cl.³ H04L *27/06, 27/22;* G06F *15/34***

**U.S. Cl. 375—86** **14 Claims**

1. A transversal correlator for demodulating a phase shift keyed (PSK) signal, comprising:

means for producing quadrature I-channel and Q-channel signals derived from said PSK signal;

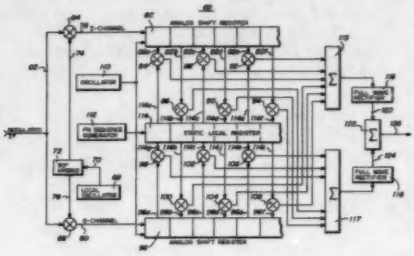
means for sampling said I-channel and said Q-channel signals to produce sequential samples;

means for storing a plurality of said samples for each of said I and Q-channel signals;

means for storing a plurality of bits comprising a selected digital code sequence;

means for correlating said digital code sequence with alternate samples of said I and Q-channel signals in said means for storing to produce a first summation signal;

means for correlating said digital sequence with the remaining alternate samples in said means for storing to produce a second summation signal; and



means for combining said first and said second summation signals to produce a correlation output signal.

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**4,392,233**

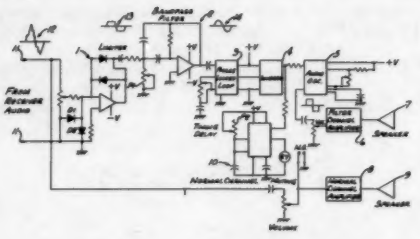
**METHOD OF FILTERING ELECTROMAGNETIC WAVES AND DUAL CHANNEL AUDIO CODE FILTER THEREFOR**

**Ernest M. Laughner, 101 Henry Way, Jeannette, Pa. 15644**

**Filed May 11, 1981, Ser. No. 262,332**

**Int. Cl.³ H04B *15/00***

**U.S. Cl. 375—93** **10 Claims**



1. The method of filtering an original electromagnetic continuous wave which is broken up into discrete lengths to form intelligence comprising the steps of, converting the original broken-up electromagnetic wave into corresponding discrete lengths of a D.C. voltage signal through the use of a phase-locked loop circuit, utilizing said D.C. voltage signal to activate an audio oscillator and thereby generating a new broken-up audio wave corresponding to the original wave being filtered, audibly producing said new wave with speaker means, and simultaneously audibly producing said original wave with speaker means.

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**4,392,234**

**PCM SIGNAL INTERFACE APPARATUS**

**Rikio Maruta, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan**

**Filed May 8, 1981, Ser. No. 261,923**

**Claims priority, application Japan, May 16, 1980, 55-64016**

**Int. Cl.³ H04L *7/08***

**U.S. Cl. 375—118** **5 Claims**

1. A PCM signal interface apparatus comprising:

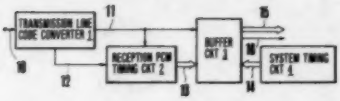
a buffer memory into which PCM signals may be asynchronously written and from which said PCM signals may be

asynchronously read wherein said buffer memory receives writing clock signals and reading clock signals;

means coupled to said buffer memory for inserting frame marker s to said PCM signal s upon writing said PCM signal s into said buffer memory;

means, coupled to said buffer memory for determining if said frame markers are contained in output signal s from said buffer memory upon the occurrance of an external read frame position designating pulse;

means coupled to said buffer memory for resetting the contents of said buffer memory and temporarily stopping writing clock signals and reading clock signals to said




buffer memory when at least one of said frame markers is not delivered out at a predetermined time;

means coupled to said buffer memory for resuming said writing clock signals to said buffer memory upon receipt of a write frame position designating pulse; and

means coupled to said buffer memory for resuming said reading clock signals to said buffer memory upon receipt of said external read frame position designating pulse at a predetermined time lapse after said resumption of said writing clock signals;

whereby the data written into said buffer memory can be read out at a desired frame phase and rate without duplicating and missing data.

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**4,392,235**

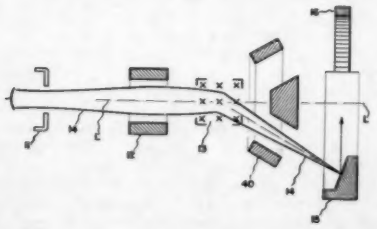
## ELECTRONICALLY SCANNED X-RAY TOMOGRAPHY SYSTEM

**John M. Houston, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Continuation of Ser. No. 66,932, Aug. 16, 1979, abandoned. This application May 26, 1981, Ser. No. 267,184**

**Int. Cl.³ G03B *41/16***

**U.S. Cl. 378—10** **6 Claims**




1. An x-ray apparatus for use in computed tomography comprising:

an electrode gun producing an electron beam having substantially circular cross section;

an arcuate anode ring;

means to focus and bend said electron beam so that said beam impinges on said anode ring at selectable points along its circumference;

an evacuable housing containing said electron gun and said anode ring;

electromagnetic deflection means disposed adjacent to said electron beam path, said deflection means being disposed along at least a portion of said electron beam path between said anode ring and said focussing and bending means to oscillatorilly deflect said electron beam in a radial direction with respect to said anode ring, so that after passing through said focussing and bending means said electron beam effectively exhibits an elongate cross section having substantially parallel sides and rounded ends, prior to impinging upon said anode ring, the long axis of said elongate cross section pointing toward an axis perpendicular to the plane containing said anode ring and passing through the center of said ring; and

a plurality of x-ray detectors configured in a substantially annular array so as to receive x-ray radiation produced at said anode ring.

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**4,392,236**

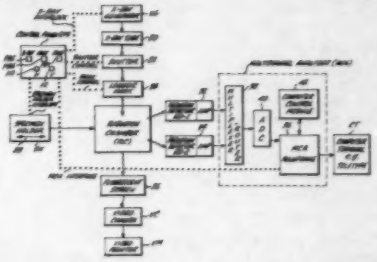
## SYSTEM AND METHOD OF MIGRATORY ANIMAL IDENTIFICATION BY FLUORESCENCE SPECTROSCOPY OF ELEMENT CODED IMPLANTED TAGS, AND TAGS USED THEREIN

**Donald R. Sandstrom, Pullman, and Farrel W. Lytle, Seattle, both of Wash., assignors to Guardsman Chemicals, Inc., Grand Rapids, Mich.**

**Filed Mar. 16, 1981, Ser. No. 243,820**

**Int. Cl.³ A01K *61/00*; G01N *23/22*; G06K *7/12***

**U.S. Cl. 378—045** **52 Claims**



1. The method of identifying the code of an identification tag implanted for a time in the body of a migratory animal, wherein the tag code comprises one or more coding elements including one or more naturally occurring, non-radioactive higher atomic numbered chemical elements in stable solid form and each present in the amount of at least about 15 micrograms, said method comprising:

(a) irradiating the tag with an X-ray beam at an energy level higher than the absorption edge of any coding element(s) in the tag and at an intensity, disregarding absorptive losses in the animal tissue surrounding the tag, of at least about $3\times10^{10}$ photons/cm$^2$-sec;

(b) masking all but the tag and the animal tissue immediately surrounding the tag from irradiation by the X-ray beam; and

(c) determining the extent of fluorescent X-ray radiation emitted by any coding element(s) in the tag and from such determination identifying the coding element(s) present in the tag and thus the code thereof.

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**4,392,237**

## SCANNING X-RAY INSPECTION SYSTEM

**John M. Houston, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Aug. 25, 1980, Ser. No. 181,161**

**Int. Cl.³ G01N *23/00***

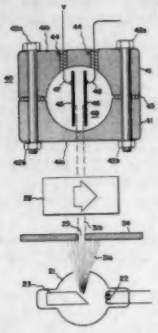
**U.S. Cl. 378—51** **10 Claims**

1. An x-ray scanning system for generating signals corresponding to x-ray absorption levels in an object comprising:

means for translationally moving said object;

x-ray means for subjecting said object to a substantially flat, fan-shaped x-ray beam, said beam being in a plane which does not contain the direction of motion of said object;

a detector, said detector having a substantially planar power electrode and a plurality of substantially planar signal electrodes spaced apart from and parallel to said power electrode, said signal electrodes being configured so as to lie in a plane substantially parallel to said power electrode, said power electrode and said signal electrodes being parallel to the plane of said fan-shaped x-ray beam and



positioned so that said beam passes between said power electrode and said signal electrodes, all of said electrodes being disposed in an x-ray transmissive housing containing a gaseous detecting medium;

means to impress a voltage on said power electrode relative to said signal electrodes;

means to sense current passing through each of said signal electrodes.

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**4,392,238**

## ROTARY ANODE FOR AN X-RAY TUBE AND METHOD OF MANUFACTURING SUCH AN ANODE

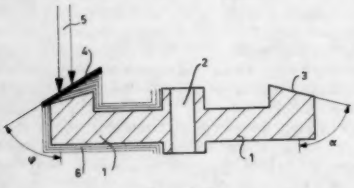
**Bernhard Lersmacher, Aachen, and Hans Lydtin, Stolberg, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jul. 14, 1980, Ser. No. 167,950**

**Claims priority, application Fed. Rep. of Germany, Jul. 18, 1979, 2928993**

**Int. Cl.³ H01J *35/10***

**U.S. Cl. 378—144** **7 Claims**



1. A rotary anode for an X-ray tube including:

(a) a carbon body;

(b) a pyrolytic graphite coating on the body's surface, having a plurality of crystallographic layers extending parallel to said surface, said coating being cut through at an angle exposing ends of the crystallographic layers to form a face; and

(c) an X-ray generating metallic layer on said face.

6. A method of manufacturing a rotary anode for an X-ray tube comprising:

(a) depositing a pyrolytic graphite coating on the surface of a carbon anode body, said coating having a plurality of crystallographic layers extending parallel to said surface;

(b) cutting through the coating at an angle exposing ends of the crystallographic layers to form a face; and

(c) providing an X-ray generating metallic layer on said face.

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**4,392,239**

## X-RAY DIAGNOSTIC SYSTEM FOR ANGIOGRAPHIC X-RAY PHOTOGRAPHIC SERIES

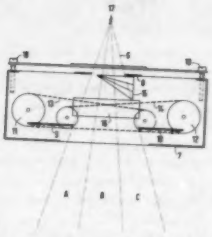
**Achim Wilkens, Langensendelbach-Braeuningshof, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany**

**Continuation of Ser. No. 150,601, May 16, 1980, abandoned. This application Jun. 24, 1982, Ser. No. 391,709**

**Claims priority, application Fed. Rep. of Germany, Jun. 22, 1979, 2925274**

**Int. Cl.³ G01K *1/04***

**U.S. Cl. 378—146** **5 Claims**



1. An x-ray diagnostic system for the preparation of angiographic x-ray photographic series over an entire area to be detected corresponding to the course of a contrast medium in a vessel system, said x-ray diagnostic system comprising a patient support (1), an x-ray tube (3) having a diaphragm installation (7) including diaphragm plates for the limitation of the x-ray beam irradiating the patient, and a cassette changer for x-ray film cassettes, characterized in that the cassette changer (4) is a cassette changer having film support means of a total longitudinal extent corresponding to the entire area to be detected, and that the diaphragm installation (7) comprises a fixed diaphragm (8) which limits the maximum size of the x-ray beam (6) to a beam configuration covering said entire area to be detected and covering said total longitudinal extent of said cassette changer while the x-ray tube is in a fixed position, individually adjustable diaphragm plates (9, 10) disposed on opposed sides of said x-ray beam for defining therebetween a resultant x-ray beam for irradiating the patient, and means (11, 12) for effecting the individual, independent adjustment of said diaphragm plates (9, 10) for selectively setting the dimension of the resultant x-ray beam in the longitudinal direction of the patient support and for directing the resultant x-ray beam toward selective respective segments of said total longitudinal extent of said cassette changer which segments lie in respective different directions from the x-ray tube requiring corresponding changes in the longitudinal axes of the respective resultant x-ray beams while said x-ray tube remains in said fixed position.

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**4,392,240**

## METHOD AND DEVICE FOR SAMPLING RADIATION FROM X-RAY MACHINES FOR ANALYSIS

**Richard Tremblay, Les Saules, and Jean Tremblay, Ste-Foy, both of Canada, assignors to Ministere Des Affaires Sociales, Quebec, Canada**

**Filed Oct. 14, 1981, Ser. No. 311,190**

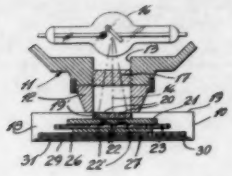
**Int. Cl.³ A61B *6/00*; H05G *1/00*; G01T *1/11***

**U.S. Cl. 378—207** **11 Claims**

9. A method of sampling a radiation field emitted from an X-ray machine for the determination of certain operational characteristics of said machine, said method comprising:

(i) disposing a cassette container having one or more ther-

mo-luminescent crystals supported therein under a respective filter, each filter having different densities from one another, said container also having an X-ray sensitive film supported under a further plurality of filters also having different densities from one another,



(ii) operating said machine to produce an X-ray beam over a predetermined area of said container and for a predetermined exposure time, and

(iii) analyzing said thermo-luminescent crystals and film to determine said operational characteristics of said machine.

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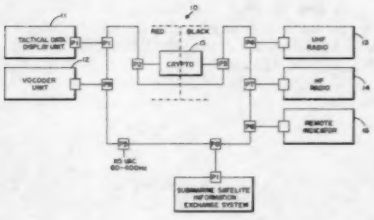
**4,392,241**

## DIGITAL INTERFACE SYSTEM

**Dennis P. Hurst, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Apr. 30, 1981, Ser. No. 258,987**
**Int. Cl.³ H04K 1/00**
**U.S. Cl. 455—26** **3 Claims**



1. A system for interfacing unclassified information and classified information to and from a pair of discrete radio links comprising:

means for generating and receiving classified and unclassified tactical data;

means for generating and receiving classified and unclassified voice coded data;

means coupled to the tactical data generating and receiving means and the voice coded data generating and receiving means for encrypting information sent therefrom and for decrypting information sent thereto;

first means coupled to the encrypting and decrypting means, the tactical data generating and receiving means and the voice coded data generating and receiving means for transmitting and receiving information to satellites in the high frequency spectrum;

means coupled to the encrypting and decrypting means, the tactical data generating and receiving means and the voice coded data generating and receiving means for transmitting and receiving information in the ultra-high frequency spectrum;

means for connecting either the tactical data generating and receiving means or the voice coded data generating and receiving means to the encrypting and decrypting means; and

means operatively coupled for providing power for the system.

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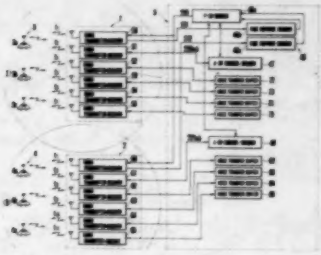
**4,392,242**

## MOBILE COMMUNICATION SYSTEM

**Tomokazu Kai, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan**

**Filed Mar. 5, 1981, Ser. No. 240,937**
**Claims priority, application Japan, Mar. 10, 1980, 55-30127**
**Int. Cl.³ H04B 1/00**
**U.S. Cl. 455—33** **3 Claims**



1. In a mobile communication system wherein a plurality of radio zones, each including one radio base station, the base stations of all radio zones being controlled by a control center which controls a paging signal and an origination signal of a mobile unit, are arranged to form a service area, and each radio zone is provided with at least one mobile access channel and a single mobile paging channel assigned to a radio frequency common to all radio zones, thus establishing speech channels for the mobile units, the improvement wherein said at least one mobile access channel of one radio zone is assigned to a radio frequency which is different from that assigned to adjacent radio zones, said control center is provided with means for controlling an origination signal of said mobile unit for selecting at least one channel among available channels allocated to a radio base station associated with said mobile unit, circuit switching means operatively connected to said origination signal control means for establishing said mobile access channel and means for broadcasting a channel number of said established mobile access channel to all radio zones through said mobile paging channel; and wherein each mobile is provided with a receiver for receiving said channel number on the mobile access channel, means for updating and storing said received channel number and means for sequentially receiving radio waves transmitted through said stored access channel and for comparing intensities of said received radio waves from each of said radio zones with each other to select a mobile access channel adapted to send out said origination signal of said mobile unit.

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**4,392,243**

## TRANSCEIVER HAVING INTERPHONE SYSTEM

**Shiro Ohhashi; Fumiyoshi Ubusawa; Shoji Iwasaki, and Tetsuyuki Manaka, all of Toda, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan**

**Filed Apr. 9, 1981, Ser. No. 252,570**
**Claims priority, application Japan, Apr. 9, 1980, 55-45680**
**Int. Cl.³ H04B 1/40**
**U.S. Cl. 455—74** **3 Claims**

1. A transceiver having an interphone system, comprising:

two microphones;

two audio transducers;

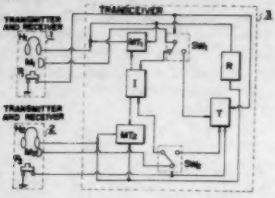
two manually operable switches;

radio transmitter means;

radio receiver means connected to said transducers;

an interphone circuit;

first and second switch means each responsive to a respective one of said manually operable switches for selectively connecting a respective one of said microphones to one of said interphone circuit and said radio transmitter means; and




first and second muting means operatively coupling said interphone circuit to respective ones of said transducers and responsive to signals output to said transducers by said radio receiver means for muting output signals from said interphone circuit.

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**4,392,244**

## AUTOMATIC TRANSMISSION AND RECEPTION CONTROL SYSTEM

**Naomi Yoshizawa, and Akira Terashima, both of Hatano, Japan, assignors to Pilot Mannenhitsu Kabushiki Kaisha, Tokyo, Japan**

**Division of Ser. No. 144,518, Apr. 28, 1980, Pat. No. 4,323,999. This application Dec. 16, 1980, Ser. No. 217,375**

**Claims priority, application Japan, Feb. 29, 1980, 55-24105**

**Int. Cl.³ H04B *1/44***

**U.S. Cl. 455—79** **4 Claims**

1. In an automatic transmission and reception control system for a transmitting and receiving device including a vibration pick-up type microphone for picking up bone-conducted voice signals, a speaker for hearing received voice sounds, and means for switching over between transmission and reception; the improvement comprising means coupled to said microphone for producing control signals from impact vibrations except voice signals uttered by a microphone wearer himself, transmitted through his bones and picked up by the microphone, and that said switching means comprises means responsive to said signals for alternately switching between transmission and reception according to the input order in which control signals are applied.

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**4,392,245**

## RADIO TRANSMITTER HAVING AN OUTPUT POWER CONTROL CIRCUIT

**Masataka Mitama, Tokyo, Japan, assignor to Nippon Electric Co., Ltd., Tokyo, Japan**

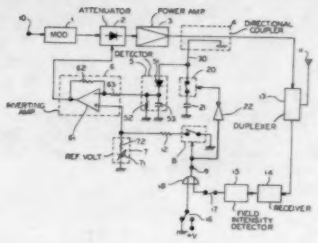
**Filed Dec. 22, 1980, Ser. No. 218,477**

**Claims priority, application Japan, Jan. 10, 1980, 55-1542[U]**

**Int. Cl.³ H04B *7/005***

**U.S. Cl. 455—115** **10 Claims**

1. A radio transmitter having a forward power output control circuit comprising power amplifier means, directional coupler means coupled to said power amplifier means, detector means for detecting the forward power output of said directional coupler means, generator means for generating a difference voltage responsive to a difference between an output voltage of said detector means and a reference voltage, power regulator means for varying the output power for said power amplifier means in response to the output of said generator




means, and first means between said directional coupler means and said detector means for varying the power applied from said power amplifier means via said directional coupler to said detector means in response to a control signal, thereby extending a controllable range for output power of said radio transmitter.

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**4,392,246**

## BROADCAST WAVE RECEIVING SYSTEM

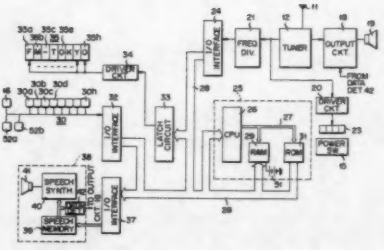
**Takeharu Niioka, and Isao Kobayashi, both of Yokohama, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan**

**Filed Aug. 24, 1981, Ser. No. 296,247**

**Claims priority, application Japan, Sep. 1, 1980, 55-120952; Sep. 1, 1980, 55-120955; Sep. 1, 1980, 55-120956; Sep. 1, 1980, 55-120957; Sep. 1, 1980, 55-120958**

**Int. Cl.³ H04B *1/26***

**U.S. Cl. 455—158** **6 Claims**




1. A broadcast wave receiving system comprising:

a tuner device;

means for storing a plurality of alphanumeric characters;

means for sequentially reading said characters from said storing means;

means for specifying a received channel call sign presetting mode;

means for producing a desired call sign data by successively selecting desired ones of said characters read out by said reading means;

call sign data storage means for successively storing call sign data from said call sign data producing means and received broadcast wave frequency data corresponding to said call sign data when said presetting mode is specified;

means for comparing data corresponding to received broadcast wave frequencies obtained from said tuner device and

frequency data stored in said call sign storage means at a time of reception after said successive data storing;

means for reading out a call sign data from said call sign data storage means in response to a frequency data coincidence output of the comparing means; and

means for informing the user of said call sign data.

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## 4,392,247

## BROADCAST RECEIVER WITH SEARCH TUNING

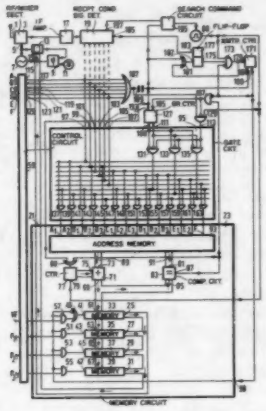
Theodorus H. M. van Deursen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 22, 1981, Ser. No. 256,365

Claims priority, application Netherlands, May 29, 1980, 8003087

Int. Cl.³ H03J 7/00

U.S. Cl. 455—161 2 Claims



1. A broadcast receiver including a search tuning circuit comprising a group selection circuit for selecting from a plurality of groups of tuning data stored in a memory circuit, each group of tuning data being associated with a given region, a search action of the search tuning circuit for scanning a selected group of tuning data being initiated when a transmission which corresponds to a tuning datum from the selected group provides reception which is too weak, the search action being terminated when a transmission which corresponds to a tuning datum from the selected group provides sufficiently strong reception, characterized in that the receiver further includes an automatic control circuit comprising means for activating said group selection circuit to select one of said groups of tuning data, a transmitter counter, means for initializing said transmitter counter and for activating said search tuning circuit for scanning said selected group of tuning data for a transmission that would provide sufficiently strong reception, means for incrementing said transmitter counter each time a transmission is accepted and for continuing said scanning by said search tuning circuit until said entire selected group of tuning data is scanned, means for causing said group selection circuit to select said selected group of tuning data if the number of accepted transmissions in said selected group of tuning data, as indicated by said transmitter counter, is equal to or exceeds a predetermined number, and means for reactivating said group selection circuit to select another one of said plurality of groups of tuning data for scanning if the number of accepted transmissions in said selected group of tuning data, as indicated by said transmitter counter, is less than said predetermined number, whereby said automatic control circuit automatically selects for reception, under the control of said counter, when this counter has counted a sufficient number of transmissions which are receivable with sufficient strength and which correspond to tuning data from the same group, that particular group.

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## 4,392,248

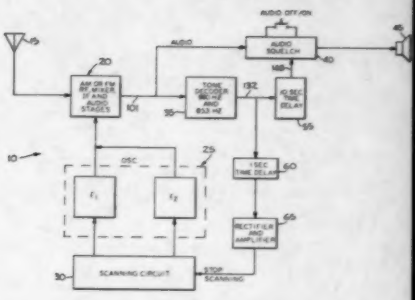
## ATTENTION SIGNAL RECEIVER FOR EMERGENCY BROADCAST SYSTEMS

Calvin Eckels, San Jose, and John James, Los Gatos, both of Calif., assignors to Time and Frequency Technology, Inc., Santa Clara, Calif.

Filed Oct. 5, 1981, Ser. No. 308,611

Int. Cl.³ H04B 1/26; H03J 7/20

U.S. Cl. 455—161 12 Claims



7. An attention receiver for use in emergency broadcast systems comprising:

(a) first means for picking up radio frequency signals each having a carrier modulated by an attention signal;

(b) second means including a first detector for receiving said radio frequency signals;

(c) oscillating means applying different respective oscillating frequencies to said first detector for producing an intermediate frequency signal modulated by an attention signal;

(d) a scanning circuit connected to said oscillating means to control the operation thereof to produce continuously and sequentially different respective oscillating frequencies;

(e) a second detector connected to said second means for producing an attention audio signal from said intermediate frequency signal modulated by the attention signal;

(f) alert means for alerting an operator;

(g) a circuit connected to said second detector for operating said alert means in response to receiving said attention audio signal;

(h) a tone decoder connected to said second detector for detecting said attention audio signal; and

(i) third means including a time delay circuit connected to said tone decoder and said scanning circuit, said third means applying a stop scan signal to said scanning circuit in response to detection of said attention audio signal by said tone decoder for a period of time in excess of a predetermined period of time to lock in said second means for reception of one of said attention signal modulated carrier signals.

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## 4,392,249

## ELECTRONIC CHANNEL SELECTION APPARATUS WITH SURFACE ACOUSTIC WAVE DEVICE

Shigeo Matsuura, and Ikuo Yuki, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 25, 1981, Ser. No. 247,268

Claims priority, application Japan, Mar. 25, 1980, 55-36867

Int. Cl.³ H04B 1/26; H03J 7/28, 7/26

U.S. Cl. 455—164 6 Claims

1. An electronic channel selection apparatus with a surface acoustic wave device comprising:

(a) an electronic tuner including a voltage-controlled local

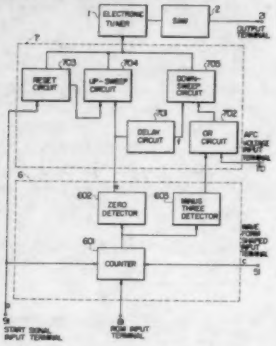
oscillator which produces an output signal whose output frequency is variable in response to a control voltage for controlling the tuning frequency of the tuner;

(b) a surface acoustic wave comb filter at the input terminal thereof connected to the output terminal of said local oscillator and producing an output having a comb-shape output characteristic including a plurality of output peaks which successively appear at predetermined frequencies;

(c) an amplitude detector for detecting the output of said surface acoustic wave comb filter;

(d) an amplifier for amplifying the output of said amplitude detector;

(e) a shaping circuit connected to said amplifier for shaping the output waveform therefrom;




(f) a presettable counter coupled to said shaping circuit for counting the number of times that the output level of said amplitude detector changes at the time of a frequency sweeping operation of said voltage-controlled local oscillator; and

(g) a sweep circuit connected to said presettable counter for sweeping the control voltage of said local oscillator upwardly toward an upper level and then sweeping the control voltage downwardly toward a lower level while checking only during said downward sweep as to whether or not an AFC voltage detection sinal is present, thereby selecting a desired channel.

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**4,392,250**

## SYMMETRIC MICROWAVE MIXER

**Ben R. Hallford, Wylie, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed May 19, 1981, Ser. No. 265,128**
**Int. Cl.³ H04B *1/26***
**U.S. Cl. 455—327** **33 Claims**

1. Balun coupled microwave mixer circuit layout and structure comprising:

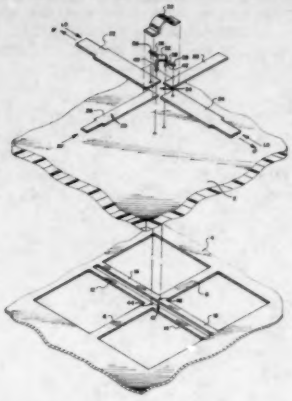
a dielectric substrate having first and second surfaces;

ground plane means on a first surface of said substrate;

first and second conductors on said first surface of said substrate extending from said ground plane means towards each other to a separation gap therebetween;

a transmission line on said second surface of said substrate for interacting with said first and second conductors to balun couple a field balanced between said first and second conductors across said gap;

third and fourth conductors on said second surface of said substrate having spaced adjacent ends proximate the separation gap of said first and second conductors and extending oppositely away therefrom and



a diode mixer interconnecting said conductors for heterodyne modulation product signal generation.

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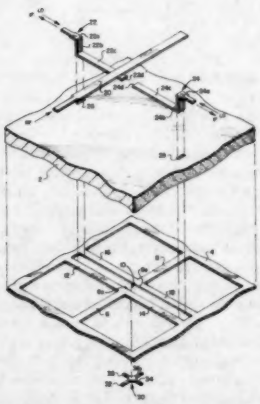
**4,392,251**

## SYMMETRIC MICROWAVE MIXER WITH COPLANAR DIODE CONNECTION

**Ben R. Hallford, Wylie, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.**

**Filed Jul. 24, 1981, Ser. No. 286,412**
**Int. Cl.³ H04B *1/26*; H03H *7/42***
**U.S. Cl. 455—327** **24 Claims**



13. Balun coupled microwave circuit layout and structure comprising:

a dielectric substrate;

ground plane means on the bottomside of said substrate;

first and second conductors on the bottomside of said substrate collinearly extending from said ground plane means towards each other and terminating in respective spaced ends to a separation gap therebetween;

a transmission line on the topside of said substrate juxtaposed said first and second conductors for interacting therewith to balun couple to field balanced between said first and second conductors across said gap;

a third conductor having a topside section on the topside of said substrate and having a linking section extending down

through said substrate to a bottomside section on the bottomside of said substrate, said bottomside section having a facing end proximate the facing ends of said first and second conductors; and

a diode pair mixer connected to said first and second conductors and said bottomside section at coplanar connection points on the bottomside of said substrate for heterodyne modulation product signal generation.

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**4,392,252**

**SIGNAL TRANSMISSION SYSTEM COMPRISING A MONOLINEARITY PRODUCT PRECORRECTION DEVICE**

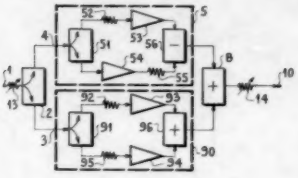
**Claude Cluniat, Chatou, France, assignor to L.G.T. Laboratoire General des Telecommunications, Chatou, France**

**Filed May 11, 1981, Ser. No. 262,427**

**Claims priority, application France, May 14, 1980, 80 10847**

**Int. Cl.³ H04B *1/04;* H03F *1/26***

**U.S. Cl. 455—116** **5 Claims**



1. In a signal transmission system having an amplifier power stage and a device for precorrection of non-linear products introduced by said amplifier power stage of the system, the precorrection device comprising:

a signal input coupled through a first power dispatcher to a principle linear channel and to a subsidiary channel wherein said subsidiary channel includes a non-linearity product generator which non-linearity generator comprises a second power dispatcher feeding in parallel a linear amplification channel and a non-linear amplification channel, and a subtractor effecting the difference between the output signal of said linear amplification channel and the output signal of said non-linear amplification channel to generate only non-linearity signals opposite in phase to said non-linearity products to be corrected;

an output adder connected to the outputs of the principle channel and the subsidiary channel which outputs a signal which is the sum of the signal supplied by said two channels, wherein said principle channel comprises a third power dispatcher feeding in parallel two third power dispatcher linear amplification channels similar to the linear amplification channel of the non-linearity product generator, and an adder combining the output signals of said two third power dispatcher linear amplification channels which adder outputs a signal transmitted to said output adder, and

a adjusting device for adjusting the amplitude of said non-linearity products being provided by the output of said output adder.

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**4,392,253**

**PHASE LOCKED LOOP CIRCUIT**

**Takaaki Yamada; Yoshio Osakabe, and Yukio Tsuda, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Dec. 24, 1980, Ser. No. 220,112**

**Claims priority, application Japan, Dec. 29, 1979, 54-170789**

**Int. Cl.³ H04B *1/26;* H03J *7/28;* H03L *7/18***

**U.S. Cl. 455—165** **12 Claims**

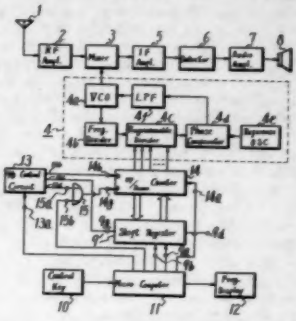
1. A phase-locked loop circuit comprising:

reference signal oscillator means providing a reference oscillating signal;

voltage controlled oscillator means having an output providing an output oscillating signal whose frequency depends on an error signal applied thereto;

programmable divider means connected to the output of said voltage controlled oscillator means for providing a divided-down signal, having a programmable dividing ratio and having a control terminal for receiving a programming control signal for programming the dividing ratio thereof;

phase comparator means supplied with said reference oscillating signal and said divided-down signal and an output providing said error signal in response to the phase difference therebetween;



data register means supplied with a clock pulse signal and a selection signal in synchronism with the clock pulse signal for providing said programming control signal from an output thereof; and

up/down counter means coupled between the output of said data register means and the control terminal of said programmable divider means to latch the programming control signal therein, and to selectively increment the same to control the dividing ratio of said programmable divider means.

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**4,392,254**

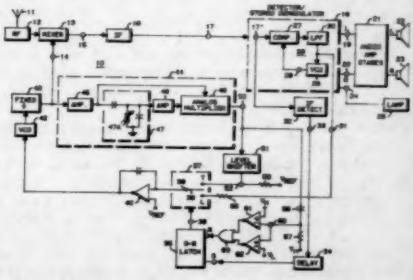
**MECHANICAL TUNER WITH MICROPHONICS ELIMINATION CIRCUITRY**

**Lawrence M. Ecklund, Wheaton, Ill., assignor to Motorola Inc., Schaumburg, Ill.**

**Filed Sep. 29, 1980, Ser. No. 191,970**

**Int. Cl.³ H04B *1/26***

**U.S. Cl. 455—173** **12 Claims**



1. A mechanical receiver tuner with microphonics elimination circuitry, comprising:

tunable front end receiver means including local oscillator

means for developing a local oscillator signal having a frequency which effectively selects a received signal frequency and rejects signals at frequencies substantially different from said received signal frequency;

mechanical tuning means operative in a tuning mode for tuning said front end means to a desired signal frequency in accordance with the position of at least one mechanically movable tuning element which provides an associated variable tuning impedance having a magnitude determined in accordance with the position of said movable tuning element, the local oscillator signal frequency being determined by and corresponding to the magnitude of said tuning impedance;

electronic tuning means operative in a locked tuning mode for maintaining said receiver front end means tuned to a received signal frequency by developing a control voltage and utilizing said control voltage to control the frequency of said local oscillator means such that the tuning of said front end means tracks the received signal frequency; and

switch means for implementing said tuning mode and utilizing said movable tuning element to provide a desired magnitude of said associated variable tuning impedance for initially selecting a desired received signal frequency, and for implementing said locked tuning mode while terminating said tuning mode by subsequently disconnecting said movable tuning element and said associated variable tuning impedance from control of said local oscillator signal frequency and effectively connecting said electronic tuning means to substantially control the frequency of said local oscillator signal, whereby mechanical vibrations during the locked tuning mode which move the position of the movable tuning element and thereby alter the magnitude of said associated variable impedance do not affect the local oscillator signal frequency.

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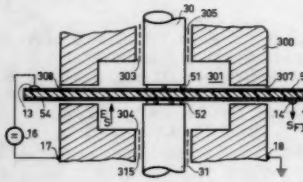
**4,392,255**

## COMPACT SUBHARMONIC MIXER FOR EHF WAVE RECEIVER USING A SINGLE WAVE GUIDE AND RECEIVER UTILIZING SUCH A MIXER

**Michel Del Giudice, Paris, France, assignor to Thomson-CSF, Paris, France**

**Filed Jan. 8, 1981, Ser. No. 223,474**
**Claims priority, application France, Jan. 11, 1980, 80 00613**
**Int. Cl.³ H04B *1/26***
**U.S. Cl. 455—328** **6 Claims**




1. A subharmonic mixer for an extremely high frequency wave receiver for receiving high frequency waves including a wideguide carrying the signal to be received, wherein said waveguide further comprises:

a local oscillator means for producing a signal at one half the frequency of said received high frequency waves wherein said local oscillator includes a first module having a conductive support, a semiconductor diode with a negative resistance, wherein one electrode of said diode is in contact with the support of said first module and wherein the other electrode is in electrical contact with a metal coating with said metal coating extending over a dielectric material placed on the support and surrounding said diode;

a detector means including a second module having a second conductive support, two semiconductor diodes mounted in antiparallel connection, with each of said diodes having an electrode in electrical contact with said second support and the other electrode of each of said diodes is in electrical contact with a second metal coating with said second metal coating extending over a second dielectric placed on said second support and surrounding said two diodes;

first connecting means in mechanical and electrical contact with said first metal coating for connecting said local oscillator module to a D.C. supply means; and

second connecting means in mechanical and electrical contact with said second metal coating for connecting said detector means to processing circuits of said receiver.

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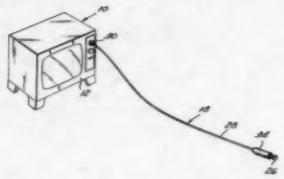
**4,392,256**

## MECHANICAL REMOTE CONTROL DEVICE FOR A TELEVISION RECEIVER

**Jerry E. Russell, 124 Via Baja, Ventura, Calif. 93003**

**Filed Jul. 18, 1980, Ser. No. 170,138**
**Int. Cl.³ H04B *1/06*; H04N *5/44***
**U.S. Cl. 455—354** **2 Claims**



1. In combination with a television receiver, said television receiver having a rotatable volume control shaft, said volume control shaft being longitudinally movable between a retracted position and an extended position, with said volume control shaft in said retracted position said television receiver is inoperative, with said volume control shaft in said extended position said television receiver is operative, a mechanical remote control device for moving said volume control shaft, said device comprising:

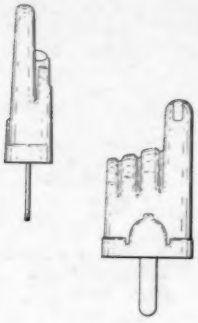
a sleeve for snugly receiving said volume control shaft;

a twisted stranded cable secured to said sleeve, said twisted stranded cable extending a spaced distance from said television receiver terminating in a free end;

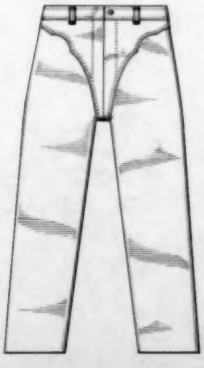
a manually graspable knob assembly attached to said twisted stranded cable at said free end; and

encasing means covering said twisted stranded cable and a portion of said manually graspable knob assembly, said encasing means being secured against longitudinal movement in respect to said television receiver yet permitting lateral flexibility of said twisted stranded cable relative to said television receiver, said twisted stranded cable being rotatable within said encasing means and also being longitudinally movable relative to said encasing means during movement of said volume control shaft between said retracted position and said extended position, said encasing means comprises a cover located about said twisted stranded cable, said cover being connected to a second sleeve, said second sleeve having an internal chamber, a portion of said manually graspable knob assembly being located within said internal chamber and being longitudinally movable in respect thereto.

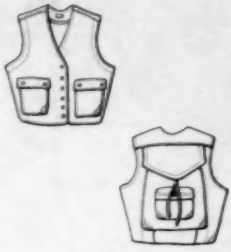
269,559
CONFECTION ON A STICK
Jose M. Sellares, c/o McCann Erickson SA, Gran Via Carlos III, 136-138 Barcelona, Spain
Filed Feb. 6, 1981, Ser. No. 232,296
Claims priority, application United Kingdom, Aug. 7, 1980, 996057
Term of patent 14 years
Int. Cl. D01—*01*
U.S. Cl. D1—22



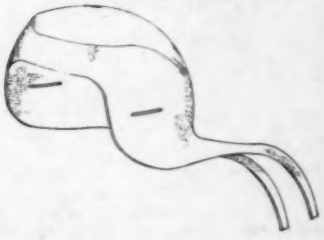
269,560
PANTS
Mark T. Sheppard, and Lynda J. Timbers, both of 105 E St., Roseville, Calif. 95678
Filed Feb. 6, 1981, Ser. No. 231,973
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—28



269,561
COMBINED VEST AND BACK PACK
Robert L. Scott, 1651 Market St., Suite 202, San Francisco, Calif. 94103
Filed Jul. 16, 1982, Ser. No. 398,933
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—184



269,562
SURGICAL HOOD
Jacob A. Glassman, 1680 Michigan Ave., Miami Beach, Fla. 33139
Filed Apr. 6, 1981, Ser. No. 251,495
Term of patent 14 years
Int. Cl. D02—*03*
U.S. Cl. D2—243

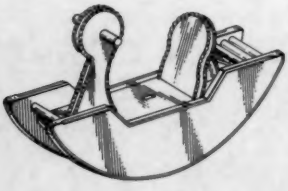


269,563
SELF DEFENSE KEY RING
Kent H. M. Lee, 2122 20th St., Santa Monica, Calif. 90405
Filed Oct. 27, 1980, Ser. No. 208,053
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D3—62

269,564
LUGGAGE
Ted Stark, 60 Eagle Rock Way, Montclair, N.J.
Filed Feb. 4, 1980, Ser. No. 100,811
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D3—71

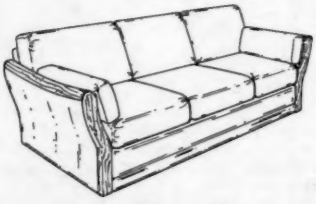
269,565
SCRUB BRUSH
Sylvia Goldstaub, 5777B Sims Rd., Palm Greens, Delray Beach, Fla. 33445
Filed Oct. 6, 1980, Ser. No. 193,936
Term of patent 14 years
Int. Cl. D4—*01*
U.S. Cl. D4—10

269,566
CHILD'S ROCKER
Eugene Sexton, 118 Kings Dr., Warren, Ohio 44481
Filed May 26, 1981, Ser. No. 266,893
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—11

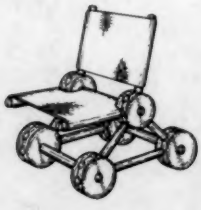


269,567
MUSICAL INSTRUMENT STAND OR SIMILAR ARTICLE
Robert A. Lorenzini, P.O. Box 91, Hancock, Mass. 01237
Filed Jun. 4, 1981, Ser. No. 270,259
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—29

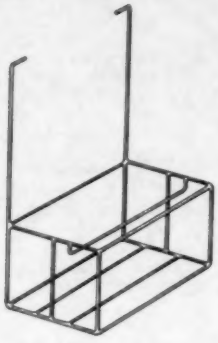
269,568
SOFA
Deborah Nelson, Knoxville, Tenn., assignor to The Berkline Corporation, Morristown, Tenn.
Filed Dec. 8, 1980, Ser. No. 213,816
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—63



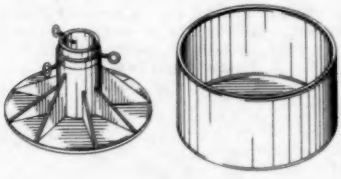
269,569
SPOOL AND SPINDLE CHAIR
Michael W. Bowen, 1847 Parr Hwy., Adrian, Mich. 49221
Filed Jun. 25, 1981, Ser. No. 277,258
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—75



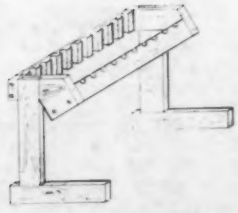
269,570
AUXILIARY TOILET PAPER ROLL HOLDER
Charles B. O'Keefe, 2579 N. Miller Rd., Scottsdale, Ariz. 85257
Division of Ser. No. 84,591, Oct. 15, 1979, Pat. No. Des. 263,009. This application Apr. 16, 1981, Ser. No. 254,964
Term of patent 14 years
Int. Cl. D23—02; D6—06
U.S. Cl. D6—97



269,571
COMBINED CHRISTMAS TREE STAND AND CONTAINER THEREFOR
Herbert W. Geshwind, 11408 N. 30th Ave., Phoenix, Ariz. 85029
Filed Nov. 25, 1981, Ser. No. 325,092
Term of patent 14 years
Int. Cl. D6—99
U.S. Cl. D6—105

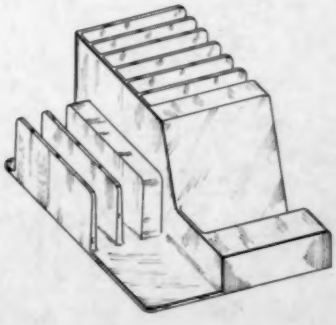


269,572
PISTOL RACK
John E. Aspenwall, 1327 Madrid Way, Sandy, Utah 84070
Filed Nov. 7, 1980, Ser. No. 205,683
Term of patent 14 years
Int. Cl. D06—04
U.S. Cl. D6—188



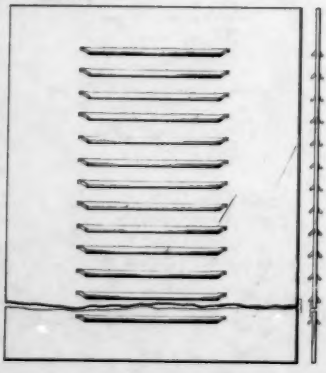
269,573
EQUIPMENT ORGANIZER USED PRIMARILY BY BARBERS AND BEAUTICIANS
Stanley T. Sikora, 1710 Highland Blvd., Hoffman Estates, Ill. 60195
Filed Feb. 10, 1981, Ser. No. 233,213
Term of patent 14 years
Int. Cl. D06—04
U.S. Cl. D6—188

269,574
RACK FOR HOLDING BEVERAGE ORDER CHECKS
Robert G. Dougherty, 12375 Dodd Blvd., Rosemount, Minn. 55068
Filed Mar. 12, 1981, Ser. No. 242,834
Term of patent 14 years
Int. Cl. D6—04
U.S. Cl. D6—189

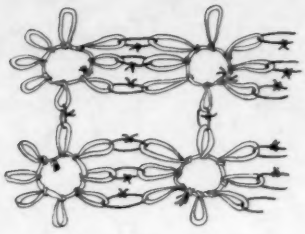


269,575
COMBINED PILLOW AND FINGER PUPPETS
A. Edward Fogarty, and Bonnie R. Fogarty, both of 3513 School Ave., Sarasota, Fla. 33579
Filed Dec. 29, 1980, Ser. No. 220,706
Term of patent 14 years
Int. Cl. D6—*09*; D21—*01*
U.S. Cl. D6—203

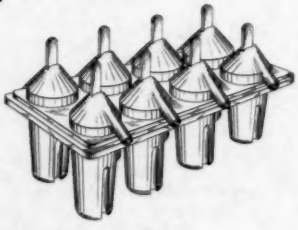
269,576
INDUSTRIAL TRAFFIC CURTAIN STRIP
Edward S. Robbins, Jr., Rte. 7, Box 322, Florence, Ala. 35630
Filed Apr. 14, 1981, Ser. No. 254,200
Term of patent 14 years
Int. Cl. D6—*10*
U.S. Cl. D6—208.1

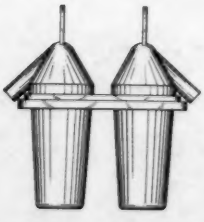


269,577
TABLECLOTH OR THE LIKE
Zana J. Wilson, 1625 Mesquite St., Abilene, Tex. 79601
Filed Aug. 14, 1980, Ser. No. 178,102
Term of patent 14 years
Int. Cl. D6—*13*
U.S. Cl. D6—275



269,578
MOLD FOR FORMING FROZEN FOOD PRODUCT
Paul Straubinger, 21-33 28th St., Astoria, N.Y. 11105
Filed Apr. 24, 1980, Ser. No. 143,312
Term of patent 14 years
Int. Cl. D07—*04*
U.S. Cl. D7—43





269,579
**MOLD FOR CONFECTIONERY OR BAKERY PRODUCT OR THE LIKE**
Beryl E. Carlomagno, 4120 Stillmeadow Way, Sacramento, Calif. 95821
Filed Feb. 25, 1982, Ser. No. 351,850
Term of patent 14 years
Int. Cl. D07—*02*
U.S. Cl. D7—44

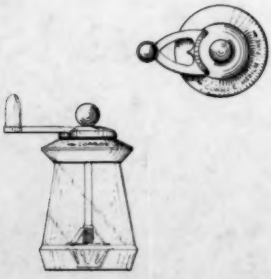
269,580
**CONDIMENT MILL**
William E. Bounds, 3737 W. 240th St., Torrance, Calif. 90505
Filed Aug. 10, 1981, Ser. No. 291,297
Term of patent 14 years
Int. Cl. D07—*06*
U.S. Cl. D7—53

269,581
**CONDIMENT MILL**
William E. Bounds, 3737 W. 240th St., Torrance, Calif. 90505
Filed Aug. 10, 1981, Ser. No. 291,306
Term of patent 14 years
Int. Cl. D07—*06*
U.S. Cl. D7—53

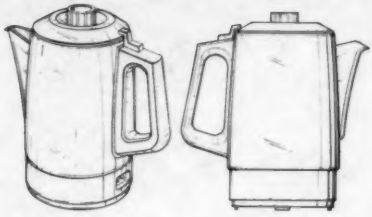
269,582
**CONDIMENT MILL**
William E. Bounds, 3737 W. 240th St., Torrance, Calif. 90505
Filed Aug. 10, 1981, Ser. No. 291,307
Term of patent 14 years
Int. Cl. D07—*06*
U.S. Cl. D7—53

269,583
CONDIMENT MILL
William E. Bounds, 3737 W. 240th St., Torrance, Calif. 90505
Filed Aug. 10, 1981, Ser. No. 291,308
Term of patent 14 years
Int. Cl. D07—*06*
U.S. Cl. D7—53

269,584
CONDIMENT MILL
William E. Bounds, 3737 W. 240th St., Torrance, Calif. 90505
Filed Aug. 10, 1981, Ser. No. 291,778
Term of patent 14 years
Int. Cl. D07—*06*
U.S. Cl. D7—53

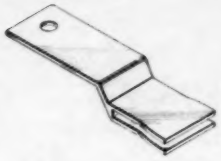


269,585
PERCOLATOR
Alan A. Phillips, Kewaskum, Wis., assignor to Dart Industries Inc., Northbrook, Ill.
Filed Mar. 12, 1981, Ser. No. 243,098
Term of patent 14 years
Int. Cl. D07—*02*
U.S. Cl. D7—321



269,586
DISPOSABLE PAN FOR HEATING AND SERVING FOOD
David F. Allgeyer; Philip P. Johnson, both of Conway, and John W. Gilliom, Wooster, all of Ark., assignors to UMC Industries, Inc., Stamford, Conn.
Continuation-in-part of Ser. No. 240,800, Mar. 5, 1981. This application Oct. 19, 1981, Ser. No. 312,382
Term of patent 14 years
Int. Cl. D07—*02*
U.S. Cl. D7—359

269,587
**PULL TAB OPENER**
Mark H. Hanslmair, 10037 Culver Blvd., Culver City, Calif. 90230
Filed May 29, 1981, Ser. No. 268,192
Term of patent 14 years
Int. Cl. D07—*99*
U.S. Cl. D8—40



269,588
**TOOL HANDLE**
David Ludwig, St. Louis, Mo., assignor to Allan Air Products, St. Louis, Mo.
Filed Jan. 21, 1981, Ser. No. 226,873
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—107

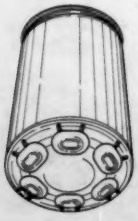
269,589
**COMBINED FIXING AND RETAINING CLIP FOR ELONGATE BODIES**
Daiji Nakama, Chigasaki, Japan, assignor to Nifco, Inc., Yokohama, Japan
Filed Oct. 27, 1980, Ser. No. 200,741
Claims priority, application Japan, May 31, 1980, 55-21589
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—356

269,590
**SNAP LOCK FASTENER**
Conny Jansson, Enköping, Sweden, assignor to AB Bahco Verktyg, Enköping, Sweden
Filed Oct. 9, 1980, Ser. No. 195,507
Claims priority, application Sweden, Apr. 18, 1980, 80-0309
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—382

269,591
**BOTTLE**
Henri D'Orleans, Paris, France, assignor to L'Oreal, Clichy, France
Filed Nov. 6, 1980, Ser. No. 204,573
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—335

269,592
COMBINED BOTTLE AND CAP
Michael Barney, Leeds, England, assignor to Lever Brothers Company, New York, N.Y.
Filed Jul. 26, 1979, Ser. No. 61,139
Claims priority, application United Kingdom, Jan. 30, 1979, 988336
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—367

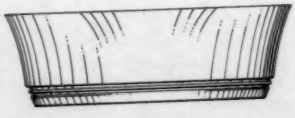
269,593
CONTAINER FOR LIQUIDS OR THE LIKE
Robert J. Gruodis, Oak Lawn; William T. Franz, Palos Park, and Edward J. Hayes, Elmhurst, all of Ill., assignors to The Continental Group, Inc., Stamford, Conn.
Filed Mar. 27, 1981, Ser. No. 248,663
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—370



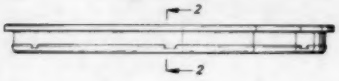
269,594
BOTTLE OR SIMILAR ARTICLE
William R. Gurolnick, Morton Grove, Ill., assignor to Gold Eagle Co., Chicago, Ill.
Filed Jan. 16, 1981, Ser. No. 225,465
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—389

269,595
BOTTLE
Donald Murray, Succasunna, N.J., assignor to J. L. Prescott Co., Passaic, N.J.
Filed Mar. 24, 1981, Ser. No. 246,925
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—413

269,596
POURING SPOUT ATTACHMENT FOR A PAINT CAN OR SIMILAR ARTICLE
James C. Fowkes, 6060 Briggs Lake Dr., Brighton, Mich. 48116
Filed Apr. 15, 1981, Ser. No. 254,459
Continuation-in-part of Ser. No. 46,005, Jun. 6, 1979
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—447



269,597
LID FOR A CONTAINER
Alun Harries, London, England, assignor to Metal Box Limited, Reading, England
Filed Dec. 1, 1980, Ser. No. 211,933
Claims priority, application United Kingdom, Jun. 12, 1980, 995299
Term of patent 14 years
Int. Cl. D9—*07*
U.S. Cl. D9—454

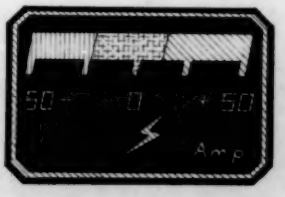



269,598
SURVEYOR'S STAKE
Edward E. Anderson, 9323 Bennet Lake Rd., Fenton, Mich. 48430
Filed Jun. 29, 1981, Ser. No. 278,732
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—66

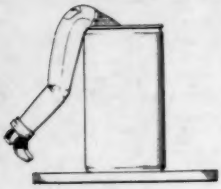
269,599
SCALE FOR WEIGHING PRECIOUS METALS AND THE LIKE
Richard W. Perry, Seekonk, Mass., and Ronald J. Medeiros, East Providence, R.I., assignors to Four R's Mfg. Corp., East Providence, R.I.
Filed Mar. 10, 1981, Ser. No. 242,203
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—87

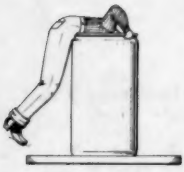
269,600
ROUND HOUSEHOLD SCALE
Dana W. Mox, Elk Grove Village, Ill., assignor to Tricolor Corporation, Las Cruces, N. Mex.
Filed Jul. 28, 1980, Ser. No. 173,683
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—91

269,601
FACE FOR MOTOR VEHICLE AMPERE METER
John L. O'Driscoll, 41 Saranac Ave., Youngstown, Ohio 44505
Filed Mar. 18, 1981, Ser. No. 244,177
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—125

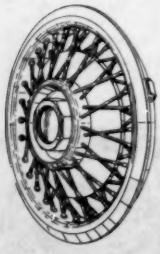


269,602
NOVELTY SCULPTURE
Diana J. Fedora, Rte. 1, Box 178, Sidney, Mont. 59270
Filed Jan. 15, 1981, Ser. No. 225,730
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—160

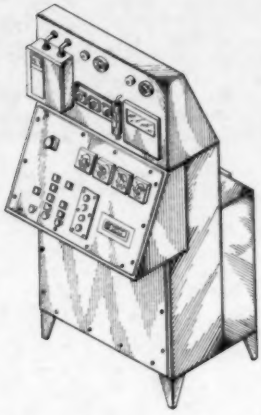




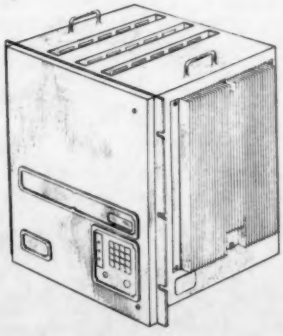
269,603
WHEEL COVER
Herbert F. Whitmarsh, High Barnet, England, assignor to Initial Plastics Limited, High Barnet, England
Filed May 26, 1981, Ser. No. 267,052
Claims priority, application United Kingdom, Jan. 8, 1981, 998377
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—205



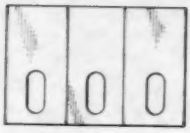
269,604
SLURRY DISPENSER CONTROL CONSOLE
William A. Strong, and Kenneth Church, both of Pine Bluff, Ak., assignors to Strong Manufacturing Co., Inc., Pine Bluff, Ark.
Filed Jul. 7, 1980, Ser. No. 165,857
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—12



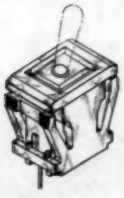
269,605
PROGRAMMABLE CONTROLLER HOUSING
Salvatore R. Provanzano, Melrose, Mass., and John J. Finnegan, Jr., Hudson, N.H., assignors to Gould Inc., Rolling Meadows, Ill.
Filed Oct. 3, 1980, Ser. No. 193,593
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—12



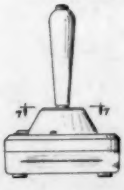
269,606
**HEAT SINK OR SIMILAR ARTICLE**
William D. Jordan, and Howard G. Hinshaw, both of Dallas, Tex., assignors to Thermalloy Incorporated, Dallas, Tex.
Filed May 26, 1981, Ser. No. 267,359
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—23



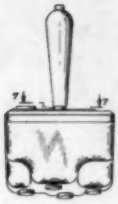
269,607
**SWITCH FRAME**
Shigeo Ohashi, c/o Nihon Kaiheiki Kogyo Kabushiki Kaisha, 5-14 Minamimagome 1-chome, Ohta-ku, Tokyo, Japan
Filed May 14, 1981, Ser. No. 263,617
Claims priority, application Japan, Nov. 10, 1980, 55-047028
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—32



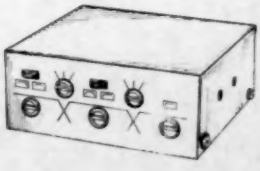
269,608
**VIDEO GAME CONTROL UNIT**
Syng N. Kim, Hoffman Estates, Ill., assignor to Wico Corporation, Niles, Ill.
Filed Jun. 21, 1982, Ser. No. 390,382
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—38



269,609
**VIDEO GAME CONTROL UNIT**
Syng N. Kim, Hoffman Estates, Ill., assignor to Wico Corporation, Niles, Ill.
Filed Jul. 1, 1982, Ser. No. 394,262
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—38



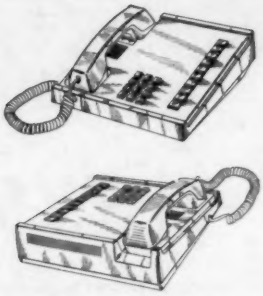
269,610
**AUTOMOBILE STEREO SYSTEM MULTI-CHANNEL ELECTRONIC CROSS-OVER NETWORK**
Hideyuki Matsubara, Tokyo, Japan, assignor to Pioneer Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 10, 1980, Ser. No. 205,699
Claims priority, application Japan, May 8, 1980, 55-17999
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—1



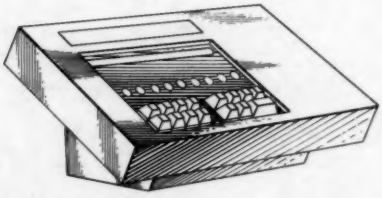
269,611
HEADPHONES
Tomonaga Saito, Ichikawa, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Aug. 19, 1981, Ser. No. 294,188
Claims priority, application Japan, Feb. 19, 1981, 56-6436
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—36

269,612
LARGE TELEPHONE KEYSET WITH DISPLAY
Donald A. Foggia, Ocean, N.J.; Deepak R. Muzumdar, Boca Raton, Fla.; Gerhart F. Klaiber, Boca Raton, Fla., and Rolf E. Schneider, Boca Raton, Fla., assignors to Siemens Corporation, Iselin, N.J.
Filed Oct. 23, 1980, Ser. No. 199,985
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—58

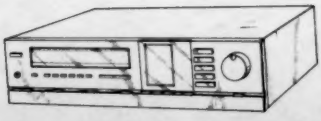
269,613
TELEPHONE WITH FUNCTION KEYS
Donald A. Foggia, Ocean, N.J.; Deepak R. Muzumdar, Boca Raton, Fla.; Gerhart F. Klaiber, Boca Raton, Fla., and Rolf E. Schneider, Boca Raton, Fla., assignors to Siemens Corporation, Iselin, N.J.
Filed Oct. 23, 1980, Ser. No. 199,990
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—58



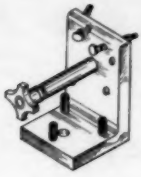
269,614
CASE FOR TELETYPE INTERFACE
John M. Murphy, Los Gatos, Calif., assignor to CHAT Corporation, Los Gatos, Calif.
Filed Feb. 17, 1981, Ser. No. 234,877
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D14—93



269,615
COMBINED AMPLIFIER AND TUNER
Kazuhiko Nishiyama, Tokyo, and Takao Itoh, Tachikawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Apr. 21, 1981, Ser. No. 256,089
Claims priority, application Japan, Jan. 19, 1981, 56-1038
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—96

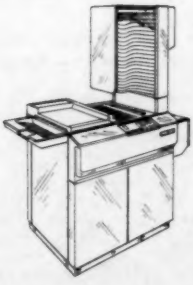


269,616
PISTON WORKING FIXTURE
James R. Crum, P.O. Box 1271, St. Charles, Mo. 63301
Filed Oct. 31, 1980, Ser. No. 202,615
Term of patent 14 years
Int. Cl. D15—*09*; D8—*05*
U.S. Cl. D15—140

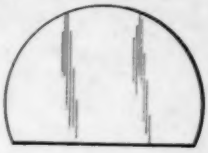


269,617
RESISTANCE WELDING ELECTRODE
Russell A. Nippert, Delaware, Ohio, assignor to The Nippert Company, Delaware, Ohio
Filed Jul. 3, 1980, Ser. No. 165,519
Term of patent 14 years
Int. Cl. D15—*09*
U.S. Cl. D15—144

269,618
COMBINED PHOTOCOPIER, SORTER AND DOCUMENT FEEDER
Louis J. H. Lucker, Tegelen, Netherlands, assignor to Oce-Nederland B.V., Venlo, Netherlands
Filed Mar. 7, 1980, Ser. No. 128,302
Claims priority, application Benelux, Sep. 13, 1979, 54043-00
Term of patent 14 years
Int. Cl. D16—*03*
U.S. Cl. D16—30



269,619
SPECTACLE HOLDER
Stefan Engelmann, 61-38 164th St., Flushing, N.Y. 11365
Division of Ser. No. 16,952, Mar. 2, 1979, Pat. No. Des. 260,527.
This application Feb. 26, 1981, Ser. No. 238,170
Term of patent 14 years
Int. Cl. D16—*06*; D6—*99*
U.S. Cl. D16—129



269,620
AUDIO CONTROL PANEL
Lance Parker, 1467 S. 50 East, Orem, Utah 84057
Filed Sep. 15, 1980, Ser. No. 187,202
Term of patent 14 years
Int. Cl. D17—*01*
U.S. Cl. D17—1

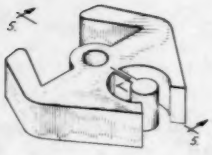
269,621
GUITAR BOWL
Charles H. Kaman, Prattling Pond Rd., Farmington, Conn. 06032
Filed Apr. 24, 1981, Ser. No. 257,182
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D17—20

269,622

**DRUM ROD ATTACHABLE DRUM KEY HOLDER**

Bruce N. Hardy, Elkhart, Ind., assignor to Silver Street, Inc., Elkhart, Ind.

Filed Mar. 25, 1981, Ser. No. 247,343
Term of patent 14 years
Int. Cl. D17—*04*; D8—*08*
U.S. Cl. D17—22

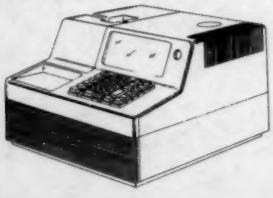


269,623

**CASH REGISTER OR SIMILAR ARTICLE**

Shuzo Kato, Hiratsuka, and Satoru Sakama, Isehara, both of Japan, assignors to NCR Corporation, Dayton, Ohio

Filed Jul. 15, 1981, Ser. No. 283,588
Claims priority, application Japan, Mar. 3, 1981, 56-8344; Mar. 3, 1981, 56-8345; Mar. 3, 1981, 56-8346; Mar. 3, 1981, 56-8347
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D18—4



269,624

**ELECTRONIC CALCULATOR**

Keiji Sakata, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan

Filed Sep. 15, 1981, Ser. No. 302,584
Claims priority, application Japan, Mar. 27, 1981, 56-13009
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D18—7

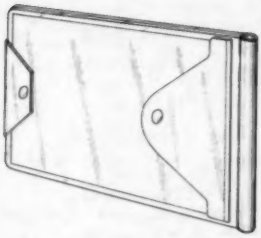
269,625

**HOLDER FOR A RULE BOOK AND SCORE CARD**

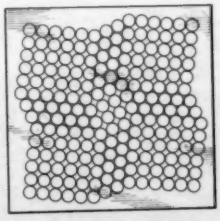
Roy C. Draddy, 9 Dunfries Pl., Floreat Park, Western Australia, Australia

Filed Jan. 30, 1981, Ser. No. 230,282
Claims priority, application Australia, Aug. 15, 1980, 81803
Term of patent 14 years
Int. Cl. D19—*04*
U.S. Cl. D19—26

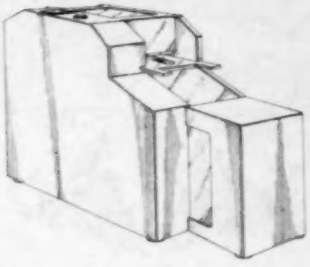
269,626
HOLDER FOR A RULE BOOK AND SCORE CARD
Roy C. Draddy, 9 Dunfries Pl., Florest Park Western Australia, Australia
Filed Jan. 30, 1981, Ser. No. 230,285
Claims priority, application Australia, Aug. 15, 1980, 81804
Term of patent 14 years
Int. Cl. D19—*04*
U.S. Cl. D19—26



269,627
GAME BOARD
David A. Westell, Box 69792, Station "K", Vancouver, B.C., Canada
Filed Jan. 12, 1981, Ser. No. 224,314
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—34



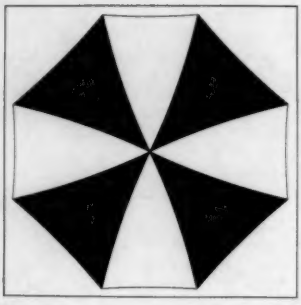
269,628
CARD-SHUFFLING DEVICE
Leo Willette, and Betty Willette, both of 1823 W. 144th St., Gardena, Calif. 90249
Filed Oct. 13, 1981, Ser. No. 284,655
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—58



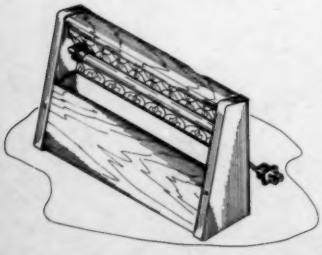
269,629
BEAD PUZZLE
Christopher C. Wiggs, 48A Queenstown Rd., London SW8 3RY, and Christopher J. C. Taylor, Flat 3, 17 Queensgate Pl., London, SW7, both of England
Filed Apr. 5, 1982, Ser. No. 365,286
Claims priority, application United Kingdom, Oct. 9, 1981, 1002925
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—104

269,630
ACTION TOY
Masaki Mayuzumi, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 12, 1980, Ser. No. 206,027
Claims priority, application Japan, Oct. 16, 1979, 54-43728
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D21—150

269,631
GUN TARGET
Charles R. Dulude, 33 Burnside Ave., P.O. Box 8301, East Hartford, Conn. 06108
Filed Feb. 10, 1981, Ser. No. 233,067
Term of patent 14 years
Int. Cl. D22—*04*
U.S. Cl. D22—15

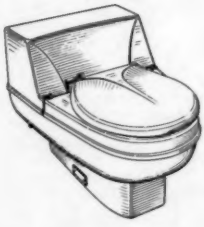


269,632
FLYING INSECT TRAP
E. Wayde Roberston, and Tommy R. Watkins, both of Jonesboro, Ark., assignors to Flintrol Incorporated, Jonesboro, Ark.
Filed Apr. 27, 1981, Ser. No. 257,892
Term of patent 14 years
Int. Cl. D22—*06*
U.S. Cl. D22—19

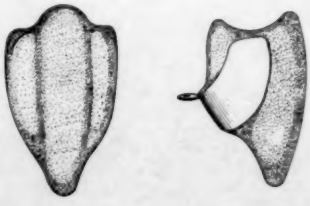


269,633
CHECK VALVE
Allan H. Willinger, 351 E. 84th St., New York, N.Y. 10028, and Tsuyoshi Itakura, Itakura Soki Kabushiki Kaisha, 17-20, Unoki 3-Chome, Ohta-Ku, Tokyo, Japan
Filed Sep. 8, 1980, Ser. No. 185,001
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—22

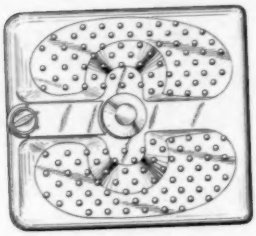
269,634
WATER CLOSET
John D. Inch, Lansdowne, and Arnold Hennessy, Wellington, both of Canada, assignors to International Water Saver Toilets, Inc., Wellington, Canada
Filed Nov. 3, 1980, Ser. No. 203,096
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—65



269,635
FALSE TOOTH
Ehrenfried G. B. Wolf, Rte. 1, Box 143 A, Raymond, Wash. 98577
Filed Jun. 9, 1980, Ser. No. 139,784
Term of patent 14 years
Int. Cl. D24—*03*
U.S. Cl. D24—33



**269,636**
**FOOT MASSAGER**
Francis W. MacGregor, New Britain, and Robert H. Bruno, Avon, both of Conn., assignors to Clairol Incorporated, New York, N.Y.
Filed Aug. 22, 1980, Ser. No. 180,532
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D24—42



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**269,637**
**HANDRAIL**
Brian Challis, 9 Northridge Way, Sandy, Utah 84070
Filed Sep. 2, 1980, Ser. No. 183,292
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—73

**269,638**
**CANDLE BASE**
Elam C. Frye, Jr., 4212 Calculus Rd., Dallas, Tex. 75234, and David R. Frye, Rte. 8, Box 161C, Longview, Tex. 75602
Filed Nov. 28, 1980, Ser. No. 211,393
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D26—9

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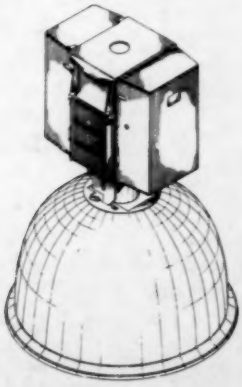
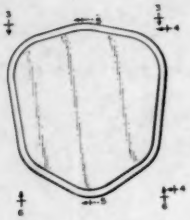
**269,639**
**LUMINAIRE**
William R. Eargle, Jr., and Winfried N. Westermann, both of Vicksburg, Miss., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed Jan. 30, 1981, Ser. No. 229,898
Term of patent 14 years
Int. Cl. D26—*05*
U.S. Cl. D26—88

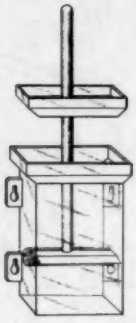


269,640
MEDICINAL TABLET
Robert J. H. Hiscock, Crowborough, England, assignor to Burroughs Wellcome Co., Raleigh, N.C.
Filed Jul. 6, 1982, Ser. No. 395,334
Claims priority, application United Kingdom, Jan. 27, 1982, 1004834
Term of patent 14 years
Int. Cl. D28—*01*
U.S. Cl. D28—2



269,641
HOT WAX EPILATION APPLICATOR
Samuel J. Mann, Englewood, N.J., assignor to Inverness International Corporation, Englewood, N.J.
Filed Jan. 29, 1982, Ser. No. 344,137
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—10

269,642
COMBINED AUTO WINDSHIELD DETERGENT RESERVOIR, COVER AND SCRUBBER/SQUEEGEE
Gary R. Sommers, 18426 Plymouth Dr., Castro Valley, Calif. 94546
Filed Feb. 4, 1980, Ser. No. 118,457
Yerm of patent 7 years
Int. Cl. D7—*05*
U.S. Cl. D32—45



269,643
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Robert G. Hartman, Greensboro, and Clayton J. Ammondson, Reidsville, both of N.C., assignors to Zarn, Inc., Reidsville, N.C.
Filed Mar 5, 1981, Ser. No. 340,894
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D34—7

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## TO WHOM

## PATENTS WERE ISSUED ON THE 5TH DAY OF JULY, 1983

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Aoki & Associates: *See*—
Mita, Kikuo; Oyama, Masayuki; Yoshida, Takashi; Nakashima, Masato; Fujihara, Katsumi; and Nakakuki, Tadao, 4,392,120, Cl. 382-22.000.

A. O. Smith Corporation: *See*—
Pfiederer, Fred R., 4,391,301, Cl. 138-103.000.

A/S Raufoss Ammunisjonsfabrikker: *See*—
Jacobsen, Kjell O.; and Engen, Gudmund, 4,391,197, Cl. 102-334.000.

Aaltonen, Olavi A.; Malmstrom, Rolf E.; Nermes, Esko O.; and Tuominen, Tapio K., to Outokumpu Oy. Process for the separation of lead from a sulfidic concentrate. 4,391,632, Cl. 75-26.000.

AB Bonnierforetagen: *See*—
Fogelberg, Ernst R., 4,391,859, Cl. 427-421.000.

AB Europa Film: *See*—
Runsten, Bengt W., 4,391,694, Cl. 204-273.000.

AB Volvo: *See*—
Weiertz, Stig H. A.; and Janiszewski, Grzegorz K., 4,391,164, Cl. 74-781.00R.

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Choudhury, Hrishikesh; and Zaha, Juergen H., 4,391,028, Cl. 29-235.000.

ABCO Industries, Inc.: *See*—
Lesley, David J.; and Davis, Lawrence C., Jr., 4,391,934, Cl. 524-43.000.

Abe, Etsuko: *See*—
Suda, Tatsuo; Hirasawa, Yoshihei; Takahashi, Sachio; Abe, Etsuko; Konno, Kunio; and Aoki, Tadao, 4,391,802, Cl. 424-236.000.

Abe, Matazo: *See*—
Tabuchi, Takeshi; and Abe, Matazo, 4,391,908, Cl. 435-144.000.

Abe, Yoshiaki; Kubota, Yutaka; and Sugimoto, Hitoshi, to Diesel Kiki Co., Ltd. Apparatus for use in starting a diesel engine. 4,391,237, Cl. 123-179.00H.

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Lloyd, Herbert W., 4,391,641, Cl. 106-36.000.

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Abraham, Nedumparambil A.: *See*—
Sestanj, Kazimir; Abraham, Nedumparambil A.; Bellini, Francesco; and Treasurywala, Adi, 4,391,816, Cl. 424-274.000.

Acquaviva, Thomas, to Xerox Corporation. Recirculating copy document. 4,391,504, Cl. 355-3.0SH.

Acumeter Laboratories, Inc.: *See*—
McIntyre, Donald B.; and McIntyre, Frederic S., 4,391,856, Cl. 427-358.000.

Adachi, Tetuo: *See*—
Ishikawa, Shinzaburo; Kanai, Kenji; Kaminaka, Nobuyuki; and Adachi, Tetuo, 4,392,166, Cl. 360-113.000.

Adams, Don L.: *See*—
Fischer, William C.; Adams, Don L.; Verzella, David J.; and Wright, Stuart C., 4,392,203, Cl. 364-434.000.

Adams, Donald L. Check valve for rod out. 4,391,289, Cl. 137-15.000.

Adler, Harold A. Animal amusement apparatus. 4,391,224, Cl. 119-29.000.

Ado, Yutaka: *See*—
Kimura, Kazuo; Takayama, Kenichiro; Ado, Yutaka; Kawamoto, Tamotsu; and Masunaga, Izumi, 4,391,910, Cl. 435-232.000.

AECI Limited: *See*—
Smith, Jeremy G. B., 4,391,659, Cl. 149-2.000.

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Geyken, Erwin, 4,392,177, Cl. 361-221.000.

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Aihara, Toshiharu: *See*—
Wakabayashi, Takuo, deceased; Wakabayashi, Shigemasa, legal representative; Tahara, Iwao; Aihara, Toshiharu; Takahashi, Naoki; and Matsuo, Yushin, 4,391,530, Cl. 368-63.000.

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McWhorter, Thomas E., 4,391,128, Cl. 73-38.000.
Riley, Eric K.; Smith, Colin D.; Yates, Garry J.; and Shepherd, Norris W., 4,391,585, Cl. 432-23.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Asahi, Kiyonobu, 4,391,260, Cl. 123-568.000.
Kawai, Shinji; Suzuki, Koichi; and Yamaguchi, Yuji, 4,391,004, Cl. 4-443.000.

Aiuchi, Susumu: *See*—
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Matsui, Hiroshi; Tsuchida, Takayasu; and Nakamori, Shigeru, 4,391,907, Cl. 435-115.000.

Akashi, Goro: *See*—
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Akerberg, Denis W.; and Watson, David D., to Quaker Oats Company, The. Furan polymer concrete. 4,391,946, Cl. 524-849.000.

Akiyama, Kozi: *See*—
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Vangbo, Hakan; Lundin, Bertil; and Moklint, Olvind, 4,391,667, Cl. 156-205.000.

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Lange, Wolfgang, 4,391,920, Cl. 521-61.000.
Wick, Gerhard; and Schulze, Helmut, 4,391,964, Cl. 528-74.500.

Akzona Incorporated: *See*—
Schreurs, Petrus H. M.; and Verhelst, Willem F., 4,391,962, Cl. 526-200.000.

Albany International Corp.: *See*—
Duncan, Jeffrey B.; and Bolton, Joseph A., 4,391,673, Cl. 162-217.000.

Albers, Richard R., to Passat-Maschinenbau GmbH. Drum for a continuously operating laundry processing machine. 4,391,108, Cl. 68-143.000.

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Scourtes, George, 4,391,131, Cl. 73-118.000.

Allibert S.A.: *See*—
Moret, Michel, 4,391,386, Cl. 220-343.000.

Allied Corporation: *See*—
Mani, Krishnamurthy; and Chlanda, Frederick P., 4,391,680, Cl. 204-98.000.

Alpi Milchindustrie reg. Gen. m.b.H.: *See*—
Kocher, Johann, 4,391,837, Cl. 426-583.000.

Alps Electric Co., Ltd.: *See*—
Miyano, Hiroshi, 4,391,538, Cl. 400-145.100.

Alting, Cornelis L.; Brehm, Rudolf; and Haitsma, Jan, to U.S. Philips Corporation. Method for the precision/manufacture of glass articles. 4,391,622, Cl. 65-66.000.

Amano, Itaru: *See*—
Ichikawa, Katsumi; Amano, Itaru; Oraki, Keiji; and Suzuki, Seiichi, 4,391,769, Cl. 264-326.000.

Amax Inc.: *See*—
Wang, Teh P.; and Korn, Elmer J., 4,392,044, Cl. 219-118.000.

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Steigerwald, Wolf-Erhard; Ambros, Peter; and Gatzke, Erich, 4,391,742, Cl. 252-512.000.

Amend, William E.: *See*—
Studhalter, Walter R.; Amend, William E.; and Helgeson, Norman L., 4,391,102, Cl. 60-649.000.

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Batchelor, Jay A., 4,391,365, Cl. 206-63.300.
Campbell, Jay E.; Reichmann, Richard H.; and Lehmann, Li K., 4,391,402, Cl. 227-121.000.
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Siuta, Gerald J.; and Bernstein, Seymour, 4,391,824, Cl. 424-315.000.

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McCurry, H. Michael, 4,391,716, Cl. 210-799.000.

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Cummins, Donald L., 4,391,576, Cl. 425-241.000.

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Paffrath, Edgar C., 4,391,379, Cl. 212-187.000.

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Duca, James F.; and Moline, Jerry A., 4,392,156, Cl. 358-183.000.
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Haldipur, Gaurang B.; Anderson, Richard G.; and Cherish, Peter, 4,391,611, Cl. 48-197.00R.

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Nakauchi, Hideo; Kato, Shingo; and Ando, Yukio, 4,391,942, Cl. 524-526.000.

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Aoki, Takashi: *See—*
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Hanlon, Richard J.; and Vetter, Rudi O. H., 4,391,408, Cl. 339-75.00M.

Auge, Claude, to Etat Francais. Bidirectional dispersible shaped-charge mine. 4,391,198, Cl. 102-401.000.

Aumann, James T., to Christensen, Inc. Drill string safety valve. 4,391,328, Cl. 166-325.000.

Austin Company, The: *See—*
Mazurkewitz, Anthony R., 4,391,495, Cl. 350-452.000.

Automated Packaging Systems, Inc.: *See—*
Weyandt, Ronald R., 4,392,056, Cl. 250-339.000.

Automation Industries, Inc.: *See—*
Lewis, James C.; Miller, Jerry W.; Simpson, Clyde D.; and Thomasson, Ronald G., 4,392,104, Cl. 324-54.000.

Automotive Products Limited: *See—*
Burke, John P., 4,391,162, Cl. 74-579.00R.

AVI, Inc.: *See—*
Archibald, G. Kent, 4,391,600, Cl. 604-153.000.

Aya, Masahiro; Saito, Junichi; Yasui, Kazuomi; Kakabu, Shinzo; Kamochi, Atsumi; and Yamaguchi, Naoko, to Nihon Tokushu Noyaku Seizo K.K. 2-Pyridyloxyacetanilides and their use as herbicides. 4,391,629, Cl. 71-94.000.

Ayerst, McKenna & Harrison Inc.: *See—*
Bellini, Francesco; Sestanj, Kazimir; and Humber, Leslie G., 4,391,825, Cl. 424-319.000.
Sestanj, Kazimir; Abraham, Nedumparambil A.; Bellini, Francesco; and Treasurywala, Adi, 4,391,816, Cl. 424-274.000.

Azarniouch, Mahmoud K., to Pulp and Paper Research Institute of Canada. Method of producing lime in a rotary kiln. 4,391,671, Cl. 162-30.100.

Azegami, Hitoshi: *See—*
Shibata, Fujio; Kawahara, Hiroshi; and Azegami, Hitoshi, 4,391,877, Cl. 428-457.000.

B. F. Goodrich Company, The: *See—*
Okamoto, Yoshihisa, 4,391,970, Cl. 528-408.000.

B.H.F. (Engineering) Limited: *See—*
Pack, Ernest A., 4,391,413, Cl. 241-99.000.

B-Systems, Inc.: *See—*
Andren, Carl F.; and Mosley, William H., Jr., 4,392,232, Cl. 375-86.000.

B-W Health Products, Inc.: *See—*
Mitchell, Larry D.; and Keith, Charles W., Jr., 4,391,007, Cl. 5-60.000.

Baba, Fumio: *See—*
Nakano, Masao; Baba, Fumio; Nakano, Tomio; Takemae, Yoshihiro; and Mochizuki, Hirohiko, 4,392,211, Cl. 365-200.000.

Babcock-Bau GmbH: *See*—
Bonnighausen, Manfred, 4,391,070, Cl. 52-127.200.
Babiol, Pierre, to Societe Nouvelle de Bouchons Plastiques S.N.B.P. Oversealing caps. 4,391,383, Cl. 215-256.000.
Bachler, Anton R. Machine arrangement for forming tracks and/or levelling surfaces related to cross-country ski trails or downhill ski slopes. 4,391,051, Cl. 37-223.000.
Bacon, Dennis R.; and Bossu, Frank P., to Procter & Gamble Company, The. Controlled release laundry bleach product. 4,391,723, Cl. 252-90.000.
Bacon, Dennis R., to Procter & Gamble Company, The. Controlled release laundry bleach product. 4,391,724, Cl. 252-90.000.
Baczek, Stanley K.; McCain, G. Howard; Benezra, Leo L.; and Covitch, Michael J., to Diamond Shamrock Corporation. Method for making linings and coatings from soluble cross-linkable perfluorocarbon copolymers. 4,391,844, Cl. 427-44.000.
Bahr, Dietrich J.; and Briska, Marian, to International Business Machines Corporation. Record carrier for electro-erosion printers. 4,392,143, Cl. 346-135.100.
Bailey, Kenneth I. Aquatic toboggan slide. 4,391,201, Cl. 104-70.000.
Bair, Scott S., III: *See*—
Vermillion, Don W.; Gromek, Francis S.; and Bair, Scott S., III, 4,391,018, Cl. 15-339.000.
Baitz, Gunter, to Nixdorf Computer AG. Device for the stepwise feed of printing media in an electromechanical print unit. 4,391,542, Cl. 400-605.000.
Bajulaz, Roger. Medium distance transport device. 4,391,200, Cl. 104-20.000.
Baker, Samuel F.; and Arnold, Ronald D., to Texas Iron Works, Inc. Liner and hydraulic liner hanger setting arrangement. 4,391,325, Cl. 166-208.000.
Bakker, Paul G. H., to Wool Development International Limited. Textile treatment. 4,391,605, Cl. 8-495.000.
Balda-Werke Photographishe Gerate und Kunststoff GmbH & Co., KG: *See*—
Lange, Karl-Heinz, 4,391,501, Cl. 354-149.000.
Ball Brothers: *See*—
Bartoe, Otto E., Jr., 4,391,424, Cl. 244-207.000.
Ball Corporation: *See*—
Woodruff, Robert A., 4,391,525, Cl. 356-346.000.
Ballard, B. G.: *See*—
Godbey, John K.; and Ballard, B. G., 4,391,135, Cl. 73-155.000.
Ban, Keisuke; and Arai, Takeo, to Honda Giken Kogyo Kabushiki Kaisha. Connecting rod of internal combustion engine. 4,391,161, Cl. 74-579.00E.
Banse, Gary D.: *See*—
Abraham, Jeffrey L.; and Banse, Gary D., 4,391,264, Cl. 124-50.000.
Barak, Yoram: *See*—
Medel, Louis W., Jr.; and Barak, Yoram, 4,391,574, Cl. 418-195.000.
Bardon, Charles: *See*—
Burger, Jacques; Bardon, Charles; and Gadelle, Claude, 4,391,555, Cl. 405-264.000.
Burger, Jacques; Bardon, Charles; and Gadelle, Claude, 4,391,556, Cl. 405-264.000.
Barham, Peter J.; and Selwood, Alan, to Imperial Chemical Industries PLC. Extraction of poly(β-hydroxybutyric acid). 4,391,766, Cl. 264-210.100.
Barkats, Gerard; Girard, Alain; Marchal, Jean; and Morel, Charles, to Societe Nationale Industrielle Aerospatiale. Solar generator providing electricity and heat. 4,392,007, Cl. 136-248.000.
Barlow, George J.: *See*—
Brown, Richard P.; Barlow, George J.; and Peters, Arthur, 4,392,201, Cl. 364-200.000.
Barmag Barmer Maschinenfabrik AG: *See*—
Lorenz, Hellmut, 4,391,091, Cl. 57-340.000.
Barnes, John: *See*—
Brinton, Michael B. J.; Barnes, John; and Chandler, Peter D., 4,391,239, Cl. 123-198.00E.
Barry-Wehmiller Company: *See*—
Wiggins, Edmund C., 4,391,373, Cl. 209-526.000.
Bartoe, Otto E., Jr., to Ball Brothers. Method and structure for airfoil thrust and lift control. 4,391,424, Cl. 244-207.000.
BASF Aktiengesellschaft: *See*—
Fauth, Karl-Heinz; Mohr, Heinrich; and Immel, Wolfgang, 4,391,959, Cl. 526-70.000.
BASF Wyandotte Corporation: *See*—
Korczak, Alexander; and Levis, William W., Jr., 4,391,728, Cl. 252-182.000.
Schwartz, Ellen S.; Tincher, Cline A.; and Maxwell, Jerrold F., 4,391,722, Cl. 252-73.000.
Bastian, Thomas W.; and Speicher, John M., to General Dynamics, Pomona Division. Dual cable drive rolling arc gimbal. 4,392,140, Cl. 343-765.000.
Batchelor, Jay A., to American Cyanamid Company. Single dispensing multiple suture package. 4,391,365, Cl. 206-63.300.
Bates, Ronald F.: *See*—
Wang, Chih C.; and Bates, Ronald F., 4,391,720, Cl. 252-49.600.
Battelle-Institut e.V.: *See*—
Lorenz, Peter; and Schwaier, Anita, 4,391,796, Cl. 424-9.000.
Battelle Memorial Institute: *See*—
Miller, Donald M., 4,391,430, Cl. 251-205.000.
Batzill, Wolfgang, to Glasurit America, Inc. Coating process. 4,391,858, Cl. 427-407.100.
Baud, Jean F. Winch operating handle. 4,391,432, Cl. 254-365.000.
Bauer, Robert, to Miles Laboratories, Inc. System for the determination of glucose in fluids. 4,391,905, Cl. 435-14.000.
Bauer, Robert, to Miles Laboratories, Inc. System for the determination of glucose in fluids. 4,391,906, Cl. 435-14.000.
Baumgarten, Jorg; Frommer, Werner; Schmidt, Delf; Schmidt, Friedrich; and Munnecke, Douglas M., to Bayer Aktiengesellschaft. Preparations of micro-organisms. 4,391,887, Cl. 435-42.000.
Baxter Travenol Laboratories Inc.: *See*—
Czuba, Leonard F.; and Laurin, Dean G., 4,391,029, Cl. 29-450.000.
Bay, David L.: *See*—
Knoll, William C.; and Bay, David L., 4,392,085, Cl. 315-173.000.
Bayer Aktiengesellschaft: *See*—
Baumgarten, Jorg; Frommer, Werner; Schmidt, Delf; Schmidt, Friedrich; and Munnecke, Douglas M., 4,391,887, Cl. 435-42.000.
Block, Hans-Dieter; and Dahmen, Hans, 4,391,761, Cl. 260-969.000.
Hildebrand, Dietrich, 4,391,607, Cl. 8-549.000.
Kruckenberg, Winfried; Schaudebutte, Karl H.; and Hederich, Volker, 4,391,606, Cl. 8-525.000.
Reitz, Gunther; Jakobs, Karlhans; and Bochenke, Gunther, 4,391,718, Cl. 252-8.700.
Stetter, Jorg; Reiser, Wolf; and Faust, Wilfried, 4,391,626, Cl. 71-88.000.
Bayne, Robert T.; and Shireman, Phillip E., to Standard Change-Makers, Inc. Magnetic ticket dispenser. 4,391,387, Cl. 221-13.000.
Beall, George H.; and Corning Glass Works. Strengthened glass-ceramic article and method. 4,391,914, Cl. 501-4.000.
Beall, Richard W., Jr.: *See*—
Tyler, Truman V.; and Sprague, Robert B., 4,391,712, Cl. 210-652.000.
Beatrice Foods Co.: *See*—
Harrison, David E., 4,391,001, Cl. 4-236.000.
Bechtel International Corp.: *See*—
O'Hara, John W., 4,391,552, Cl. 405-59.000.
Beck, Theodore R., to Electrochemical Technology Corp. Shaft seal resistant to electrokinetic corrosion. 4,391,450, Cl. 277-1.000.
Becka, Michael M., to International Shoe Machine Corporation. Swingable insole rest. 4,391,012, Cl. 12-10.500.
Becker, Kunibert: *See*—
Weirich, Walter; Dettmers, Michael; Becker, Kunibert; and Rosenberg, Harry, 4,391,181, Cl. 91-29.000.
Becker, Wilhelm, to Hoechst Aktiengesellschaft. Elasticized addition product based on polyalkylene ether-polyols and polyisocyanates, preparation and use thereof. 4,391,957, Cl. 525-454.000.
Beckman Instruments, Inc.: *See*—
Boris, Michael J., 4,391,780, Cl. 422-102.000.
Piramoon, Alireza; and Woodruff, Rebecca J., 4,391,597, Cl. 494-20.000.
Becton, Dickinson and Company: *See*—
Kagan, Jonathan, 4,391,274, Cl. 604-190.000.
Pearlman, Samuel R., 4,391,795, Cl. 424-1.000.
Bednard, Eugene D.: *See*—
Kung, Edward J.; and Bednard, Eugene D., 4,392,213, Cl. 367-13.000.
Beecham Group Limited: *See*—
Evans, John M., 4,391,815, Cl. 424-274.000.
Beecroft, Julian B. Exercise apparatus. 4,391,443, Cl. 272-145.000.
Beifuss, Wolfgang: *See*—
Schmitter, Ernst; Birzele, Paul; Buchmann, Klaus; Geitz, Gerhard; Will, Bernhard; and Beifuss, Wolfgang, 4,392,199, Cl. 364-200.000.
Belcher, Gloria Jeanne: *See*—
Belcher, Walter C., 4,391,551, Cl. 405-43.000.
Belcher, Walter C., to Belcher, Walter C.; and Belcher, Gloria Jeanne. Snake cleanable fluid flow system. 4,391,551, Cl. 405-43.000.
Belko, Robert P.; Boden, Richard M.; and Hanna, Marie R., to International Flavors & Fragrances Inc. Norbornyl oxyacetaldehyde, organoleptic uses thereof and process for preparing same. 4,391,744, Cl. 252-522.00R.
Belko, Robert P.: *See*—
Sprecker, Mark A.; Hanna, Marie R.; Tokarzewski, Richard J.; Belko, Robert P.; Watkins, Hugh; and Vock, Manfred H., 4,391,284, Cl. 131-276.000.
Bell, Anthony J., to Goodyear Tire & Rubber Company, The. Catalysts for ring-opening copolymerization of cycloolefins. 4,391,737, Cl. 252-429.00B.
Bell, David: *See*—
Glenn, Raymond R.; and Bell, David, 4,392,196, Cl. 364-200.000.
Bell Telephone Laboratories, Incorporated: *See*—
Boggs, Luther M.; and Gardner, William B., 4,391,516, Cl. 356-73.100.
Buckley, Reginald R.; and Ostermayer, Frederick W., Jr., 4,391,683, Cl. 204-129.300.
Curtis, Hazen, III, 4,392,031, Cl. 200-16.00R.
Feldmann, William L.; Rowell, John M.; and Schmidt, Paul H., 4,391,657, Cl. 148-133.000.
Henry, Paul S., 4,392,231, Cl. 375-80.000.
Jin, Sungho; and Tiefel, Thomas H., 4,391,656, Cl. 148-102.000.
Bellini, Francesco; Sestanj, Kazimir; and Humber, Leslie G., to Ayerst, McKenna & Harrison Inc. N-[[6-(Lower alkoxy)-5-(trifluoromethyl-thio)-1-naphthalenyl]thioxomethyl]-N-(lower alkyl)glycines. 4,391,825, Cl. 424-319.000.
Bellini, Francesco: *See*—
Sestanj, Kazimir; Abraham, Nedumparambil A.; Bellini, Francesco; and Treasurywala, Adi, 4,391,816, Cl. 424-274.000.
Benaroya, Henry: *See*—
Le Foll, Jean; and Benaroya, Henry, 4,391,708, Cl. 210-242.300.

Bender, Emil A. Reciprocating drive and reversing mechanism for long stroke, well pumping unit. 4,391,155, Cl. 74-89.200.

Bendix Corporation, The: *See*—
Arnett, Samuel E., 4,391,092, Cl. 60-39.290.
Gollomp, Bernard P., 4,392,107, Cl. 324-73.00R.

Benezra, Leo L.: *See*—
Baczek, Stanley K.; McCain, G. Howard; Benezra, Leo L.; and Covitch, Michael J., 4,391,844, Cl. 427-44.000.

Bengal, Inc.: *See*—
Lybrand, William, 4,391,952, Cl. 525-333.700.

Benitez, Francisco M.: *See*—
Small, Augustus B.; Hughes, Vincent L.; and Benitez, Francisco M., 4,391,961, Cl. 526-76.000.

Bennett, Harvey G.: *See*—
Hearold, Owen E.; and Bennett, Harvey G., 4,392,184, Cl. 362-101.000.

Benoit-Gonin, Roger; Berger, Jean L.; and Coutures, Jean L., to Thomson - CSF. Analog-digital coder comprising a charge transfer coded voltage generation. 4,392,124, Cl. 340-347.0AD.

Benthake, Heinz; Kronert, Curt; and Kunnen, Josef, to Thyssen Industrie AG. Planetary gear assembly. 4,391,163, Cl. 74-768.000.

Bentley, Peter D.; and Pollock, James F., to United Kingdom Atomic Energy Authority. Condensation heating apparatus and method. 4,392,049, Cl. 219-401.000.

Benz, Claude L., to Colgate Palmolive Company. Non-caking bleach containing molecular sieve zeolite. 4,391,727, Cl. 252-99.000.

Berger, Isaac. Portable exercising apparatus. 4,391,440, Cl. 272-118.000.

Berger, Jean L.: *See*—
Benoit-Gonin, Roger; Berger, Jean L.; and Coutures, Jean L., 4,392,124, Cl. 340-347.0AD.

Bergmeister, Josef J. Lift-top can opener. 4,391,167, Cl. 81-3.46R.

Berman, Michael F.: *See*—
Chang, Mike S. H.; and Berman, Michael F., 4,391,888, Cl. 430-57.000.

Bernstein, Seymour: *See*—
Siuta, Gerald J.; and Bernstein, Seymour, 4,391,824, Cl. 424-315.000.

Berruti, Pierangelo: *See*—
Bovio, Michele; Berruti, Pierangelo; and Gillone, Walter, 4,392,146, Cl. 346-140.00R.

Berry, Derek: *See*—
Jackson, Ian D.; Berry, Derek; Rowden, George A.; and Dilley, Malcolm, 4,391,711, Cl. 210-634.000.

Bertolacini, Ralph J.: *See*—
Ferreira, Laurence E.; Lamar, Richard S.; and Bertolacini, Ralph J., 4,391,734, Cl. 252-378.00R.

Bervig, Dale R. Fluid dynamic producing device. 4,392,062, Cl. 290-54.000.

Berwind Corporation: *See*—
Roach, Donald E., II, 4,392,032, Cl. 200-61.210.

Bessho, Hironori, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method and apparatus of supplying fuel in electronic control fuel injection engine. 4,391,243, Cl. 123-325.000.

Betts, Robert E., to United States of America, Army. Add-on igniter for pyrogen type igniter. 4,391,196, Cl. 102-202.000.

Beun, Jacobus P.: *See*—
Rijckaert, Albert M. A.; de Niet, Edmond; and Beun, Jacobus P., 4,392,163, Cl. 360-76.000.

Bhattacharyya, Sushantha K.: *See*—
El-Menshawy, Mohamed F.; Woodrow, Peter A.; and Bhattacharyya, Sushantha K., 4,392,110, Cl. 324-453.000.

Bialous, Charles A.; Luce, John B.; and Mark, Victor, to General Electric Company. Flame retardant polycarbonate composition. 4,391,935, Cl. 524-82.000.

Bianchi, Valerio; Ehrentraut, Franz-Josef; and Wobky, Peter, to Bosch und Pierburg System oHG. Method of operating a combustible mixture generator of an internal combustion engine and apparatus for carrying out the method. 4,391,249, Cl. 123-438.000.

BICC Public Limited Company: *See*—
Lyon, Robert C., 4,391,546, Cl. 403-189.000.

Billner, Werner; and Bock, Erich, to Schubert & Salzer. Apparatus for piecing-up a wrap yarn. 4,391,089, Cl. 57-261.000.

Billon, Alain; Le Page, Jean-Francois; Peries, Jean-Pierre; and Simandoux, Jean-Claude, to Institut Francais du Petrole. Process for converting heavy hydrocarbon oils, containing asphaltenes, to lighter fractions. 4,391,700, Cl. 208-86.000.

Bindernagel, Ali; Holthoff, Helmut; and Diel, Hartmut, to Friedrich Kocks GmbH & Company. Couplings. 4,391,357, Cl. 192-94.000.

Biomelktechnik Hoefelmayr & Co.: *See*—
Hoefelmayr, Tilman; and Maier, Jakob, 4,391,221, Cl. 119-14.080.

Biphase Energy Systems: *See*—
Studhalter, Walter R.; Amend, William E.; and Helgeson, Norman L., 4,391,102, Cl. 60-649.000.

Birkenbach, Eugen J., to International Harvester Co. Rotary hoe wheel. 4,391,335, Cl. 172-540.000.

Birzele, Paul: *See*—
Schmitter, Ernst; Birzele, Paul; Buchmann, Klaus; Geitz, Gerhard; Will, Bernhard; and Beifuss, Wolfgang, 4,392,199, Cl. 364-200.000.

Bischoff, Peter G., to Memorex Corporation. Metal oxide patterns with planar surface. 4,391,849, Cl. 427-129.000.

Bittner, Friedrich: *See*—
Spindler, Manfred; Tanner, Herbert; Geiger, Friedhelm; Bittner, Friedrich; and Martens, Jurgen, 4,391,987, Cl. 562-559.000.
Spindler, Manfred; Tanner, Herbert; Geiger, Friedhelm; Bittner, Friedrich; and Martens, Jurgen, 4,391,988, Cl. 562-559.000.

Black, Charles E., III: *See*—
Schaad, William J.; Black, Charles E., III; and Halstead, Raymond T., 4,392,029, Cl. 200-5.00B.

Black & Decker Inc.: *See*—
Saar, David A.; and Walter, Richard T., 4,392,101, Cl. 320-20.000.

Blaisdell, Ronald G.: *See*—
Hough, Harold L.; and Blaisdell, Ronald G., 4,392,189, Cl. 362-306.000.

Blake, Charles R.: *See*—
Sugalski, Raymond K.; and Blake, Charles R., 4,392,102, Cl. 320-48.000.

Blakeley Engineering Limited: *See*—
Blakeley, James, 4,391,458, Cl. 285-112.000.

Blakeley, James, to Blakeley Engineering Limited. Pipe coupling with gasket locating means. 4,391,458, Cl. 285-112.000.

Blanco, Albert. Respirator circuit. 4,391,271, Cl. 128-203.120.

Block, Hans-Dieter; and Dahmen, Hans, to Bayer Aktiengesellschaft. Process for the production of aryl phosphonyl compounds. 4,391,761, Cl. 260-969.000.

Bloise, Rene; Lorang, Marcel; Morizot, Georges; and Boissonnade, Genevieve, to Bureau de Recherches Geologiques et Minieres. Method for obtaining photostable valentinite and valentinite thus obtained. 4,391,792, Cl. 423-617.000.

Blume, Ernst; Schaper, Wolfgang; Raether, Wolfgang; and Dittmar, Walter, to Hoechst Aktiengesellschaft. 1-(1,3-Dioxolan-2-ylmethyl)-azoles, their salts and their use. 4,391,805, Cl. 424-246.000.

Bock, Erich: *See*—
Billner, Werner; and Bock, Erich, 4,391,089, Cl. 57-261.000.

Bock, Martin: *See*—
Schmid, Helmut; Bock, Martin; and Kampf, Gunther, 4,391,522, Cl. 356-326.000.

Bock, Thomas-Mathias, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung. Method and apparatus for providing a uniform sound distribution in an aircraft cabin. 4,392,027, Cl. 179-181.00W.

Bockholt, Karlheinz H., to Western Publishing Inc. Optical probe. 4,392,053, Cl. 235-472.000.

Bocsa, Klara K.: *See*—
Devenyi, Tibor; Bocsa, Klara K.; Kovats, Ferenc; Pongor, Sandor; Szaboicsi, Gertrud; and Such, Mihaly, 4,391,839, Cl. 426-626.000.

Boden, Richard M., to International Flavors & Fragrances Inc. 3,4,5,6,6-Pentamethyl hexanol-2 and alkyl homologues thereof; process for preparing same and organoleptic uses thereof. 4,391,999, Cl. 568-840.000.

Boden, Richard M.: *See*—
Belko, Robert P.; Boden, Richard M.; and Hanna, Marie R., 4,391,744, Cl. 252-522.00R.

Bodenseewerk Perkin-Elmer & Co. GmbH: *See*—
Braun, Klaus, 4,391,776, Cl. 422-78.000.

Boehmke, Gunther: *See*—
Reitz, Gunther; Jakobs, Karlhans; and Boehmke, Gunther, 4,391,718, Cl. 252-8.700.

Boeing Company, The: *See*—
Aoyama, Frank S.; and Stapleton, Brian P., 4,392,139, Cl. 343-705.000.
Scholz, Klaus H., 4,391,409, Cl. 239-265.290.

Boese, Friedrich-Karl, to Interatom, Internationale Atomreaktorbau GmbH. Plant for thermochemical water dissociation by solar energy. 4,391,793, Cl. 423-648.00R.

Boettger, Horst: *See*—
Engel, Herbert; and Boettger, Horst, 4,391,094, Cl. 60-245.000.

Boggs, Luther M.; and Gardner, William B., to Western Electric Co., Inc.; and Bell Telephone Laboratories, Incorporated. Method of determining an index of refraction profile of an optical fiber. 4,391,516, Cl. 356-73.100.

Bohner, Beat, to Ciba-Geigy Corporation. Process for producing arylsulfamates. 4,391,976, Cl. 544-211.000.

Bohner, Beat: *See*—
Rempfler, Hermann; and Bohner, Beat, 4,391,628, Cl. 71-92.000.

Boissonnade, Genevieve: *See*—
Bloise, Rene; Lorang, Marcel; Morizot, Georges; and Boissonnade, Genevieve, 4,391,792, Cl. 423-617.000.

Boller, Arthur; Schadt, Martin; and Villiger, Alois, to Hoffmann-La Roche Inc. Hydrogenated naphthalenes. 4,391,731, Cl. 252-299.620.

Bolster, M. Elizabeth: *See*—
Liang, Charles C.; Bolster, M. Elizabeth; and Murphy, Robert M., 4,391,729, Cl. 252-182.100.

Boltersdorf, Dagmar: *See*—
Struck, Bernd D.; Junginger, Robert; and Boltersdorf, Dagmar, 4,391,682, Cl. 204-104.000.

Bolton, Joseph A.: *See*—
Duncan, Jeffrey B.; and Bolton, Joseph A., 4,391,673, Cl. 162-217.000.

Bolza-Schunemann, Hans-Bernhard, to Koenig & Bauer AG. Reciprocal supporting arrangement for contacting cylinders of a printing unit. 4,391,191, Cl. 101-216.000.

Bombardier-Rotax G.m.b.H.: *See*—
Holzleitner, Johann, 4,391,234, Cl. 123-65.00V.

Bonet, Jose D. Adjustable multiple bolt locking system. 4,391,460, Cl. 292-37.000.

Bonis, Laszlo J., to Composite Container Corporation. Peel resistant coextruded sheet. 4,391,863, Cl. 428-35.000.

Bonnighausen, Manfred, to Babcock-Bau GmbH. Chimney. 4,391,070, Cl. 52-127.200.

Bonnor, Yannick; Raisson, Gerard; and Honnorat, Yves, to Creusot-Loire. Process for the production of shaped parts from powders comprising spheroidal metal particles. 4,391,772, Cl. 419-23.000.
Boragine, Carlo: *See*—
Meyer, Armin; and Boragine, Carlo, 4,391,884, Cl. 430-17.000.
Borg-Warner Chemicals, Inc.: *See*—
Falk, John C.; and Juang, Mike S. D., 4,391,948, Cl. 525-57.000.
Borg-Warner Corporation: *See*—
Aubel, John A., 4,391,294, Cl. 137-493.800.
Boris, Michael J., to Beckman Instruments, Inc. Contsiner for sample testing. 4,391,780, Cl. 422-102.000.
Bornancini, Jose C. M., to Forjas Taurus S/A. Retaining means for revolver cylinders. 4,391,056, Cl. 42-62.000.
Bornancini, Jose C. M., to Forjas Taurus S/A. Actuator system for the return of the trigger in double-action revolvers. 4,391,057, Cl. 42-65.000.
Bornhorst, James M., to Vari-Lite, Ltd. Computer controlled lighting system having automatically variable position, color, intensity and beam divergence. 4,392,187, Cl. 362-233.000.
Bornstein, Norman D.; and Walters, Johnnie J., to W. R. Grace & Co., Cryovac Division. Pasteurizable thermoplastic film and receptacle therefrom. 4,391,862, Cl. 428-35.000.
Bosch und Pierburg System oHG: *See*—
Bianchi, Valerio; Ehrentraut, Franz-Josef; and Wobky, Peter, 4,391,249, Cl. 123-438.000.
Bossu, Frank P., to Procter & Gamble Company, The. Controlled release laundry bleach product. 4,391,725, Cl. 252-90.000.
Bossu, Frank P.: *See*—
Bacon, Dennis R.; and Bossu, Frank P., 4,391,723, Cl. 252-90.000.
Bottcher, Martin: *See*—
Troebel, Werner; and Bottcher, Martin, 4,392,036, Cl. 200-322.000.
Boullart, Carolus J.; and Liefkens, Adrianus C. H. J., to U.S. Philips Corporation. Magnetic shielding spring. 4,392,169, Cl. 360-130.330.
Boverman, Bentsion; and Vodyanitsky, Vilen, to Gerber Garment Technology, Inc. Apparatus for working on advancing sheet material. 4,391,170, Cl. 83-71.000.
Bovio, Michele; Berruti, Pierangelo; and Gillone, Walter, to Ing. C. Olivetti & C., S.p.A. Non-impact dot printer. 4,392,146, Cl. 346-140.00R.
Boxler, Dena L.; and Chen, Albert C., to Rhone-Poulenc Agrochimie. Novel polycyclic insecticidal esters. 4,391,823, Cl. 424-306.000.
Boyadjieff, George I.; and Campbell, Andrew B., to Varco International, Inc. Well casing jack mechanism. 4,391,333, Cl. 166-379.000.
BP Chemicals Limited: *See*—
Lynn, Malcolm; and May, Peter E., 4,391,675, Cl. 202-158.000.
Brady, Reginald D. Clothing travel bag. 4,391,396, Cl. 224-205.000.
Bralorne Resources Limited: *See*—
Ellett, James R., 4,391,152, Cl. 73-863.840.
Bramlett, Kenneth W.: *See*—
Jackson, G. C., Jr.; Bramlett, Kenneth W.; and Dennis, James G., 4,391,547, Cl. 403-341.000.
Branen, Kenneth E.: *See*—
Salsky, Jerome; Janis, Patrick K.; and Branen, Kenneth E., 4,391,088, Cl. 57-234.000.
Branson, Daniel J.: *See*—
Mollenkopf, Lloyd C.; and Branson, Daniel J., 4,391,073, Cl. 52-241.000.
Brassell, Gilbert W.; and Lewis, John, Jr., to United States of America, Energy. High temperature thermal insulating composite. 4,391,873, Cl. 428-297.000.
Braun Aktiengesellschaft: *See*—
Gassner, Gustav, 4,392,092, Cl. 318-127.000.
Braun, Frederic: *See*—
Denkler, Maria; and Braun, Frederic, 4,391,745, Cl. 252-554.000.
Braun, Klaus, to Bodenseewerk Perkin-Elmer & Co. GmbH. Dissociation chamber and measuring cell combination useful for making measurements. 4,391,776, Cl. 422-78.000.
Brechany, Thomas: *See*—
Slattery, William; Brechany, Thomas; and MacLeod, Colin J., 4,391,115, Cl. 72-131.000.
Brehm, Rudolf: *See*—
Alting, Cornelis L.; Brehm, Rudolf; and Haisma, Jan, 4,391,622, Cl. 65-66.000.
Bresnahan, Thomas P.: *See*—
Runnels, Robert W.; Wagenaar, Loren B.; Luke, Louis E.; and Bresnahan, Thomas P., 4,392,015, Cl. 174-143.000.
Bridgestone Tire Co., Ltd.: *See*—
Ichikawa, Katsumi; Amano, Itaru; Ozaki, Keiji; and Suzuki, Seiichi, 4,391,769, Cl. 264-326.000.
Nakauchi, Hideo; Kato, Shingo; and Ando, Yukio, 4,391,942, Cl. 524-526.000.
Brinkmann, Heinrich Bernhard: *See*—
Knepper, Hermann, 4,391,623, Cl. 71-21.000.
Brinton, Michael B. J.; Barnes, John; and Chandler, Peter D., to R.N.L.I. (Trading) Limited. Inversion protection of outboard marine engines. 4,391,239, Cl. 123-198.00E.
Briska, Marian: *See*—
Bahr, Dietrich J.; and Briska, Marian, 4,392,143, Cl. 346-135.100.
Bristow, Ian T.; and Thornelow, Alec, to Hobourn-Eaton Limited. Positive displacement pump systems. 4,391,569, Cl. 417-302.000.
British Petroleum Company Limited, The: *See*—
Kolombos, Alexander J.; Telford, Clive D.; and Young, Dennis, 4,392,003, Cl. 585-661.000.
British Petroleum Company p.l.c., The: *See*—
Anderson, Susan; Brown, David E.; Graham, David E.; Mahmood, Mahmood N.; and Man, Maurice C. M., 4,391,681, Cl. 204-99.000.
Brockmeyer, Jerry W., to Swiss Aluminium Ltd. Ceramic foam filter and aqueous slurry for making same. 4,391,918, Cl. 501-127.000.
Brody, Aaron L.; Embro, Joseph J.; and Young, William E., to Mead Corporation, The. Method for providing an inert sterile atmosphere in an aseptic packaging machine. 4,391,080, Cl. 53-426.000.
Brois, Stanley J.; and Gutierrez, Antonio, to Exxon Research & Engineering Co. Thio bis-lactone compounds derived from n-octenyl succinic anhydride. 4,391,981, Cl. 549-252.000.
Bromley, Eric, to Coleco Industries, Inc. Electronic game providing formation changes and method. 4,391,444, Cl. 273-94.000.
Broms, Stig; and Freese, Lennart, to Innovation Aktiebolag. Hydraulic blocking valve. 4,391,183, Cl. 91-461.000.
Brother Kogyo Kabushiki Kaisha: *See*—
Yamamoto, Yoshikazu; and Yanagi, Toshiaki, 4,391,211, Cl. 112-121.120.
Brown, David E.: *See*—
Anderson, Susan; Brown, David E.; Graham, David E.; Mahmood, Mahmood N.; and Man, Maurice C. M., 4,391,681, Cl. 204-99.000.
Brown, David P.: *See*—
Cook, Lynn W.; and Brown, David P., 4,391,705, Cl. 210-218.000.
Brown, Gary: *See*—
Price, Ronn; Brown, Gary; Muraski, Andrew A.; and Muraski, William C., 4,392,119, Cl. 340-38.00L.
Brown, George N., to Westvaco Corporation. Two stage fluid bed regenerator. 4,391,586, Cl. 432-58.000.
Brown, Lawrence G. Brake system and apparatus and method therefor. 4,391,352, Cl. 188-24.120.
Brown, Mayo E., Jr.: *See*—
Labbe, Donald E.; and Brown, Mayo E., Jr., 4,391,101, Cl. 60-646.000.
Brown, Richard P.; Barlow, George J.; and Peters, Arthur, to Honeywell Information Systems Inc. Diagnostic subsystem for a cache memory. 4,392,201, Cl. 364-200.000.
Brown, Rollin G., to Edison International, Inc. Coating for halogen lamps. 4,391,847, Cl. 427-106.000.
Brown, Thomas A.; and Peil, William, to General Electric Company. Lighting unit. 4,392,081, Cl. 315-46.000.
Bruensicke, Wilhelm A., to Lockheed Corporation. Device for removing incendiary matter from the interior of an aircraft. 4,391,017, Cl. 15-313.000.
Bruggemann, Harro, to Dindima Group Pty. Ltd., The. Signal-to-noise improving system. 4,392,123, Cl. 340-347.0AD.
Bruner, Robert: *See*—
Sizemore, Howard; and Bruner, Robert, 4,391,043, Cl. 30-330.000.
Brunswick Corporation: *See*—
Hundertmark, James M., 4,391,592, Cl. 440-61.000.
Puryear, John W., 4,391,418, Cl. 242-84.20A.
Staerzl, Richard E., 4,391,254, Cl. 123-478.000.
Staerzl, Richard E., 4,391,255, Cl. 123-481.000.
Buchmann, Klaus: *See*—
Schmitter, Ernst; Birzele, Paul; Buchmann, Klaus; Geitz, Gerhard; Will, Bernhard; and Beifuss, Wolfgang, 4,392,199, Cl. 364-200.000.
Buckley, Reginald R.; and Ostermayer, Frederick W., Jr., to Bell Telephone Laboratories, Incorporated. Mask structures for photoetching procedures. 4,391,683, Cl. 204-129.300.
Bucksch, Manfred, to Zahnradfabrik Friedrichshafen AG. Piston-and-cylinder assembly for hydraulic disk clutch or brake. 4,391,354, Cl. 188-71.500.
Bulten-Kanthal AB: *See*—
Magnusson, Bengt; and Gurtler, Hans, 4,392,052, Cl. 219-532.000.
Burdett, Ian D., to Union Carbide Corporation. Alcohol separation process. 4,391,919, Cl. 518-725.000.
Bureau de Recherches Geologiques et Minieres: *See*—
Bloise, Rene; Lorang, Marcel; Morizot, Georges; and Boissonnade, Genevieve, 4,391,792, Cl. 423-617.000.
Burger, Jacques; Bardon, Charles; and Gadelle, Claude, to Institut Francais du Petrole. Process for consolidating geological formations. 4,391,555, Cl. 405-264.000.
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Burke, John P., to Automotive Products Limited. Fluid assisted booster. 4,391,162, Cl. 74-579.00R.
Burlington Industries, Inc.: *See*—
Daniel, Vernon T., 4,391,584, Cl. 432-8.000.
Burnett, George H.; Claflin, Warren E.; Lanzillotti, Harry V.; Lilly, A. Clifton, Jr.; Nienow, John F.; Osdene, Thomas S.; and Wayte, Alline R., to Philip Morris, Incorporated. Smoking article. 4,391,285, Cl. 131-364.000.
Burroughs Corporation: *See*—
Dockal, Ronald J., 4,392,207, Cl. 364-900.000.
Fleming, Anthony, 4,392,037, Cl. 200-340.000.
Burrows, James E.; and Greenaway, Ivan R., to International Computers Limited. Data processing system and diagnostic unit. 4,392,208, Cl. 364-900.000.
Buss, Gary L., to CTS Corporation. Adjustable rotary switch. 4,392,030, Cl. 200-11.00R.
Busse, Paul J., to InterNorth, Inc. Cleaning and regenerating ethylene oxide catalysts. 4,391,735, Cl. 252-413.000.

Bykhovsky, David G.; Voropaev, Albert A.; Olennikov, Evgeny F.; and Lopatina, Alla V. Non-consumable electrode. 4,392,047, Cl. 219-145.210.

Cabot Corporation: *See*—
Cotten, George R.; and Medalia, Avrom I., 4,391,941, Cl. 524-495.000.

Cacossa, Frank G.: *See*—
Deer, Carmine A.; and Cacossa, Frank G., 4,391,647, Cl. 106-115.000.

Cadet, Christian; Dumortier, Bernard; and Souques, Georges, to La Telemecanique Electrique. Electric protection device. 4,392,174, Cl. 361-45.000.

Cadwallader, James W., to SPS Technologies, Inc. Self-retained fastener. 4,391,544, Cl. 403-155.000.

Cahalan, Patrick T.; and Coury, Arthur J., to Medtronic, Inc. Tape electrode. 4,391,278, Cl. 128-640.000.

Cal Detect, Inc.: *See*—
Hutson, Donald G., 4,391,777, Cl. 422-84.000.

Caledonian Mining Company Limited: *See*—
Slattery, William; Brechany, Thomas; and MacLeod, Colin J., 4,391,115, Cl. 72-131.000.

Calhoun, Fredrick L., to Industrial Dynamics Company, Ltd. Vacuum starwheel. 4,391,372, Cl. 209-523.000.

Calkins Manufacturing Company: *See*—
Carrick, Lawrence K., 4,391,334, Cl. 172-326.000.

Callander, Douglas D.: *See*—
Massey, Freddie L.; and Callander, Douglas D., 4,391,971, Cl. 528-481.000.

CALZATURIFICIO S.C.A.R.P.A. S.n.c. di Parisotto Francesco & C.: *See*—
Parisotto, Francesco, 4,391,049, Cl. 36-114.000.

Campbell, Andrew B.: *See*—
Boyadjieff, George I.; and Campbell, Andrew B., 4,391,333, Cl. 166-379.000.

Campbell, Jay E.; Reichmann, Richard H.; and Lehmann, Li K., to American Cyanamid Company. Surgical stapling control means. 4,391,402, Cl. 227-121.000.

Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See*—
Armstrong, William A., 4,391,668, Cl. 156-308.200.

Canon Kabushiki Kaisha: *See*—
Fujiki, Makoto, 4,391,513, Cl. 356-1.000.
Inoue, Eiichi; Takatori, Yasushi; and Haruta, Masahiro, 4,392,141, Cl. 346-1.100.
Kobayashi, Masatsune, 4,391,639, Cl. 106-22.000.
Mabuchi, Minoru; Sakai, Kiyoshi; Ishikawa, Shozo; Egashira, Yuji; and Kitahara, Makoto, 4,391,889, Cl. 430-59.000.
Nakamura, Shunji; and Arao, Kozo, 4,391,512, Cl. 355-3.0DD.
Tajima, Akira; and Tsuji, Sadahiko, 4,391,493, Cl. 350-422.000.
Tamura, Yasuyuki; Kanbe, Junichiro; Nakamura, Shunji; Toyono, Tsutomu; and Takahashi, Tohru, 4,391,891, Cl. 430-120.000.
Tsunekawa, Tokuichi, 4,391,500, Cl. 354-31.000.

Cantrell, John H., Jr.; and Heyman, Joseph S., to United States of America, National Aeronautics and Space Administration. Frequency tracked gated pulse technique for ultrasonic frequency. 4,391,142, Cl. 73-610.000.

Cap, Heinrich, to Papst Motoren GmbH & Co. KG. Method of tensioning a tape. 4,391,398, Cl. 226-4.000.

Capshew, Charles E., to Phillips Petroleum Company. Alpha-olefin polymerization. 4,391,736, Cl. 252-429.00B.

Cargnel, Louis A.: *See*—
Scala, Luciano C.; and Cargnel, Louis A., 4,391,933, Cl. 523-454.000.

Carl Zeiss-Stiftung: *See*—
Schilling, Albert; and Schob, Wolfgang, 4,391,496, Cl. 350-519.000.

Carlsen, W. John: *See*—
Meiman, Paul; and Carlsen, W. John, 4,391,487, Cl. 350-96.200.

Carlson, David J., to RCA Corporation. Television remote control system for selectively controlling a plurality of external apparatus. 4,392,022, Cl. 179-2.0TV.

Carr, Richard F.: *See*—
Tyler, Truman V.; and Sprague, Robert B., 4,391,712, Cl. 210-652.000.

Carrick, Lawrence K., to Calkins Manufacturing Company. Hitch assembly. 4,391,334, Cl. 172-326.000.

Carrier Corporation: *See*—
Carroll, Alexander A.; and Hannan, William F., III, 4,391,349, Cl. 184-6.260.
Ciarlei, Joseph A.; Tobin, Curtis L.; and Jennings, William B., 4,391,322, Cl. 165-125.000.

Carroll, Alexander A.; and Hannan, William F., III, to Carrier Corporation. Turbomachine lubricating oil system. 4,391,349, Cl. 184-6.260.

Carroll, James J.: *See*—
Frind, Gerhard; Carroll, James J.; and Van Noy, John H., 4,392,035, Cl. 200-144.00B.

Carstab Corporation: *See*—
Kugele, Thomas G.; and Gilmore, Dennis W., 4,391,757, Cl. 260-446.000.

Carter, Brian, to Societe Prl. Electrical convertor heater. 4,392,048, Cl. 219-367.000.

Carter, Leewood C.; and Neary, Robin P. Paperboard load-supporting pallet. 4,391,202, Cl. 108-51.300.

Casey, John A.; and Ducasse, Joseph C. V., to Fabcon Incorporated. Mill roll. 4,391,026, Cl. 29-121.600.

Casio Computer Co., Ltd.: *See*—
Wakabayashi, Takuo, deceased; Wakabayashi, Shigemasa, legal representative; Tahara, Iwao; Aihara, Toshiharu; Takahashi, Naoki; and Matsuo, Yushin, 4,391,530, Cl. 368-63.000.

Cassada, William A., III: *See*—
Thurston, Michael E.; Cassada, William A., III; and Schardein, Daniel J., 4,391,655, Cl. 148-20.600.

Casull, Richard J. Trigger and firing mechanism for bolt action rifle. 4,391,058, Cl. 42-69.00A.

Catalfamo, Giuseppe. Adjustible actuator for plural dispensing devices. 4,391,389, Cl. 222-135.000.

Cau, Pasqualino: *See*—
Masotti, Maurizio; Zentile, Antonio; and Cau, Pasqualino, 4,391,464, Cl. 293-120.000.

Cavagnaro, William A., to Eastman Kodak Company. Roller fuser apparatus in which copy sheet jams are minimized. 4,391,509, Cl. 355-14.0FU.

Centronics Data Computer Corporation: *See*—
Dougherty, Edward C., 4,391,540, Cl. 400-212.000.

Champion International Corporation: *See*—
Anenson, David, 4,391,189, Cl. 101-36.000.
Lepisto, J. George, 4,391,310, Cl. 141-286.000.
Sieffert, William G., 4,391,371, Cl. 206-597.000.
Welter, Albert, 4,391,404, Cl. 229-62.500.

Champion Spark Plug Europe S.A.: *See*—
van den Berg, Johan H., 4,391,015, Cl. 15-250.420.

Chan, John K., to Union Carbide Corporation. Process for the preparation of organothioaldoxime compounds. 4,391,759, Cl. 260-453.300.

Chan, Tsiu C., to Mostek Corporation. One transistor-one capacitor memory cell. 4,392,210, Cl. 365-149.000.

Chandler, Peter D.: *See*—
Brinton, Michael B. J.; Barnes, John; and Chandler, Peter D., 4,391,239, Cl. 123-198.00E.

Chang, Mike S. H.; and Berman, Michael F., to Pitney Bowes Inc. Multilayered organic photoconductive element and process using polycarbonate barrier layer and charge generating layer. 4,391,888, Cl. 430-57.000.

Chang, Shin S.: *See*—
Gudnason, Geir V.; Crowe, Laurie M.; and Chang, Shin S., 4,391,830, Cl. 426-43.000.

Chang, Tsuan Y., to Halcon SD Group, Inc., The. Gasification of coal. 4,391,612, Cl. 48-202.000.

Chang, Wen H.; Gheewala, Tushar R.; and Harris, Erik P., to International Business Machines Corporation. Moat-guarded Josephson devices. 4,392,148, Cl. 357-5.000.

Chant, Bernard J.: *See*—
Mookherjee, Braja D.; Trenkle, Robert W.; Chant, Bernard J.; Ouwerkerk, Anton V.; Kamath, Venkatesh; and Mussinan, Cynthia J., 4,391,717, Cl. 252-8.600.

Charbonnier, Simon, to Verdol S.A. Device for pneumatically threading a yarn in a double twist spindle. 4,391,090, Cl. 57-279.000.

Charles, Barry G.: *See*—
Child, Robert P.; and Charles, Barry G., 4,391,762, Cl. 261-121.00R.

Charles Stark Draper Laboratory, Inc., The: *See*—
Stanton, William E.; Eisenhaure, David B.; and Drescher, Robert D., 4,392,100, Cl. 318-803.000.

Chemical Systems, Inc.: *See*—
Das, Narayan; and Schaefer, Joy M., 4,391,652, Cl. 148-6.15R.

Chen, Albert C.: *See*—
Boxler, Dena L.; and Chen, Albert C., 4,391,823, Cl. 424-306.000.

Chen, Si-Yu. Key-(touch-) controlled gas range. 4,391,265, Cl. 126-39.00E.

Cherian, Abraham, to Xerox Corporation. Voice coil actuator registration system. 4,391,510, Cl. 355-3.0SH.

Cherish, Peter: *See*—
Haldipur, Gaurang B.; Anderson, Richard G.; and Cherish, Peter, 4,391,611, Cl. 48-197.00R.

Cheriton, Leslie W.: *See*—
Haigh, Jeffrey G.; and Cheriton, Leslie W., 4,391,931, Cl. 523-318.000.

Chermey, Dale M., to Hayssen Manufacturing Company. Control system for cyclic machines. 4,391,079, Cl. 53-396.000.

Chevron Research Company: *See*—
Gibson, Kirk R., 4,391,740, Cl. 252-470.000.
Rosenthal, Joel W., 4,391,699, Cl. 208-8.0LE.

Child, Robert P.; and Charles, Barry G., to Thorn Emi Domestic Electrical Appliances Limited. Aerated drinks machine. 4,391,762, Cl. 261-121.00R.

Children's Hospital Medical Center, The: *See*—
Folkman, Moses J.; and Langer, Robert S., Jr., 4,391,797, Cl. 424-19.000.

Chinoin Gyogyszer es Vegyeszeti Termekek Gyara R.T.: *See*—
Korbonits, Dezso; Nogradi, Mihaly; Vermes nee Szluha, Borbala; Strelisky, Janos; Wolfner, Andras; Heja, Gergely; Kovacz, Gabor; Szegi, Jozsef; and Virag, Sandor, 4,391,821, Cl. 424-283.000.

Chiquiar-Arias, Marcelo, to Mercantile & Technical Promotions Inc. Non-reusable, disposable syringes. 4,391,273, Cl. 604-110.000.

Chiu, Chung-Wai, to National Starch and Chemical Corporation. Process for preparing instant gelling starches. 4,391,836, Cl. 426-578.000.

Chiu, Pei-Liang: *See*—
Hsu, Yun-Tung, 4,391,020, Cl. 16-314.000.

Chlanda, Frederick P.: *See*—
Mani, Krishnamurthy; and Chlanda, Frederick P., 4,391,680, Cl. 204-98.000.

Choudhury, Hrishikesh; and Zaha, Juergen H., to Abbott Laboratories. Solventless assembly of flexible tubing to a component. 4,391,028, Cl. 29-235.000.

Christensen, Inc.: *See*—
Aumann, James T., 4,391,328, Cl. 166-325.000.

Christensen, James R.: *See*—
Weber, Henry J.; Hoechst, Lonnie D.; Christensen, James R.; and Watts, Verne C., 4,391,344, Cl. 180-271.000.

Christian, Steve. Perforating device especially adapted for use with printing machines. 4,391,175, Cl. 83-678.000.

Chrysler France: *See*—
Pham, Anh T., 4,391,435, Cl. 267-140.100.

Chu, Chin-Chiun, to Mobil Oil Corporation. Zeolite catalysts modified with group IA metals. 4,391,739, Cl. 252-455.00Z.

Chugai Seiyaku Kabushiki Kaisha: *See*—
Suda, Tatsuo; Hirasawa, Yoshihei; Takahashi, Sachio; Abe, Etsuko; Konno, Kunio; and Aoki, Tadao, 4,391,802, Cl. 424-236.000.

Chung, David B.: *See*—
Lu, Sun; and Chung, David B., 4,391,492, Cl. 350-351.000.

Ciampolillo, Dominick. Corrosion preventing device for a marine propeller. 4,391,567, Cl. 416-146.00R.

Ciarlei, Joseph A.; Tobin, Curtis L.; and Jennings, William B., to Carrier Corporation. Wire guide for use with a heat exchange unit. 4,391,322, Cl. 165-125.000.

Ciba-Geigy AG: *See*—
Meyer, Armin; and Boragine, Carlo, 4,391,884, Cl. 430-17.000.

Ciba-Geigy Corporation: *See*—
Bohner, Beat, 4,391,976, Cl. 544-211.000.
Ferrill, Richard M., Jr., 4,391,648, Cl. 106-308.00M.
Hoegerle, Karl; Gsell, Laurenz; and Wehrli, Rudolf, 4,391,810, Cl. 424-251.000.
Maier, Ludwig; and Durr, Dieter, 4,391,624, Cl. 71-86.000.
Rempfler, Hermann; and Bohner, Beat, 4,391,628, Cl. 71-92.000.
Vlattas, Isidoros, 4,391,808, Cl. 424-250.000.
Zergenyi, Janos, 4,391,980, Cl. 548-239.000.

CII Honeywell Bull: *See*—
Lequien, Jean, 4,392,164, Cl. 360-77.000.

Cincinnati Mine Machinery Company, The: *See*—
Krekeler, Claude B., 4,391,472, Cl. 299-86.000.

Ciriza, Santiago A.; and Padro, Carlos E. L., to Liofilizaciones Esterilizaciones Y Sinthesis S.A. Water soluble cephadroxyl salt. 4,391,974, Cl. 544-030.000.

Citizen Watch Co., Ltd.: *See*—
Matsumura, Osamu; and Matsumoto, Masataka, 4,391,534, Cl. 368-294.000.
Waki, Masahiko, 4,391,533, Cl. 368-281.000.

Claassen, Peter: *See*—
Krempl, Peter W.; Claassen, Peter; and Zeiringer, Rudolf, 4,391,147, Cl. 73-730.000.

Claesson, Dick V., to Saab-Scania Aktiebolag. Arrangement for driving a mechanism in an internal combustion engine. 4,391,258, Cl. 123-508.000.

Claflin, Warren E.: *See*—
Burnett, George H.; Claflin, Warren E.; Lanzillotti, Harry V.; Lilly, A. Clifton, Jr.; Nienow, John F.; Osdene, Thomas S.; and Wayte, Alline R., 4,391,285, Cl. 131-364.000.

Clarion Co., Ltd.: *See*—
Ohhashi, Shiro; Ubusawa, Fumiyoshi; Iwasaki, Shoji; and Manaka, Tetsuyuki, 4,392,243, Cl. 455-74.000.
Yamada, Shigeru; and Ohhara, Kazuya, 4,392,114, Cl. 333-28.00T.

Clark Equipment Company: *See*—
Malott, Theodore A.; and Wolfe, Robert W., 4,391,158, Cl. 74-473.00R.
Weber, Henry J.; Hoechst, Lonnie D.; Christensen, James R.; and Watts, Verne C., 4,391,344, Cl. 180-271.000.

Cleaveland, Bryan L.: *See*—
Noble, Milton L.; and Cleaveland, Bryan L., 4,392,078, Cl. 315-4.000.

Clesid: *See*—
Sylvain, Daniel, 4,391,400, Cl. 226-113.000.

Cleveland William K. S.; Webb, Jimmy L.; and Orlando, Charles M., to General Electric Company. 1,1-Dichloro-2,2-bis(hydroxyphenyl-)ethylene. 4,391,996, Cl. 568-726.000.

Clinical Data, Inc.: *See*—
Stein, Israel M., 4,391,279, Cl. 128-643.000.

Cloud, Robert C.: *See*—
Lamar, Richard S.; Ferreira, Laurence E.; and Cloud, Robert C., 4,391,733, Cl. 252-378.00R.

Cluniat, Claude, to L.G.T. Laboratoire General des Telecommunications. Signal transmission system comprising a monolinearity product precorrection device. 4,392,252, Cl. 455-116.000.

Coan, Michael H.: *See*—
Mitra, Gautam; Coan, Michael H.; and Wada, Shohachi, 4,391,746, Cl. 260-112.00B.

Coates, Colin F., to Sterling Drug Inc. Waste treatment process. 4,391,715, Cl. 210-696.000.

Coburn, Joel T.: *See*—
Huber, Calvin O.; Schick, Karl G.; and Coburn, Joel T., 4,391,775, Cl. 422-68.000.

Coca Cola Company: *See*—
Gudnason, Geir V.; Crowe, Laurie M.; and Chang, Shin S., 4,391,830, Cl. 426-43.000.

Colburn, William A., to Process Development Corporation. Method and apparatus for pulverizing materials by vacuum comminution. 4,391,411, Cl. 241-1.000.

Coleco Industries, Inc.: *See*—
Bromley, Eric, 4,391,444, Cl. 273-94.000.

Colgate Palmolive Company: *See*—
Benz, Claude L., 4,391,727, Cl. 252-99.000.
Tavss, Edward A.; and Eigen, Edward, 4,391,798, Cl. 424-52.000.

Collins, William T. Door holding clamp. 4,391,437, Cl. 269-254.0CS.

Colortronic Reinhard & Co. KG: *See*—
Reinhard, Max; and Kornmayer, Horst, 4,391,140, Cl. 73-432.00R.

Colt Industries Operating Corp.: *See*—
Larson, William C., 4,391,245, Cl. 123-339.000.

Columbian Chemicals Company: *See*—
Estopinal, Earl J., 4,391,789, Cl. 423-457.000.

Columbus Show Case Company, The: *See*—
Vermillion, Eugene F., 4,391,069, Cl. 52-126.400.

Combustion Engineering, Inc.: *See*—
Anthony, Andrew J., 4,391,771, Cl. 376-451.000.
Smith, Donald A.; and Pote, Bruce M., 4,391,561, Cl. 414-218.000.

Commissariat a l'Energie Atomique: *See*—
Folcher, Gerard; and Paris, Jacques, 4,391,881, Cl. 429-111.000.

Commonwealth Scientific and Industrial Research Organization: *See*—
Holan, George; and Walser, Reimund, 4,391,820, Cl. 424-282.000.

Composite Container Corporation: *See*—
Bonis, Laszlo J., 4,391,863, Cl. 428-35.000.

Conn, Andrew F.: *See*—
Johnson, Virgil E., Jr.; Sundaram, T. R.; and Conn, Andrew F., 4,391,339, Cl. 175-393.000.

Connoy, Thomas P., to Kroy Inc. Tape-ribbon printing cartridge. 4,391,539, Cl. 400-208.000.

Conoco Inc.: *See*—
Coon, Julian B.; Fowler, James C.; Payton, Charles E.; and Waters, Kenneth H., 4,391,336, Cl. 175-45.000.
De Carlo, Leonard J., 4,391,327, Cl. 166-307.000.
Reinert, A. Joe, 4,391,228, Cl. 122-28.000.

Conradty GmbH Metallelektroden KG: *See*—
Koziol, Konrad; and Wenk, Erich, 4,391,695, Cl. 204-286.000.

Constance, Lillie B. Thermal drapery construction. 4,391,865, Cl. 428-74.000.

Constructors John Brown Limited: *See*—
Shotbolt, Keith, 4,391,331, Cl. 166-342.000.

Cook, Donald M., to NCR Corporation. Multiple source clock encoded communications error detection circuit. 4,392,226, Cl. 371-61.000.

Cook, John R.; and James, William A., to Johnson & Johnson Baby Products Company. Nonwoven fibrous product. 4,391,869, Cl. 428-218.000.

Cook, Kenneth V.; Cunningham, Robert A., Jr.; and Murrin, Horace T., to United States of America, Energy. Ultrasonic probe for inspecting double-wall tube. 4,391,143, Cl. 73-623.000.

Cook, Lynn W.; and Brown, David P., to Envirotech Corporation. Ballasting digestor covers. 4,391,705, Cl. 210-218.000.

Coon, Julian B.; Fowler, James C.; Payton, Charles E.; and Waters, Kenneth H., to Conoco Inc. Acoustic system to guide a coal seam auger. 4,391,336, Cl. 175-45.000.

Cooper, Glenn D., to General Electric Company. Polyphenylene ether composition and process for production. 4,391,950, Cl. 525-132.000.

Cordova, Samuel; and Spitz, Robert J., to Spitz, Robert J. Automatic fish hook setter. 4,391,059, Cl. 43-15.000.

Corley, Robert C.; and Myers, Frederick F., Jr., to United States of America, Air Force. Copper containing ballistic additives. 4,391,660, Cl. 149-19.900.

Cornell Research Foundation, Inc.: *See*—
Drost, Cornelis J.; and Milanowski, G. Jan, 4,391,124, Cl. 73-1.0DV.
Szkolnik, Michael, 4,391,813, Cl. 424-269.000.

Corning Glass Works: *See*—
Beall, George H.; and Corning Glass Works, 4,391,914, Cl. 501-4.000.

Costa Bastart, Enrique. Door catch. 4,391,463, Cl. 292-263.000.

Costello, Louis B., to Teletype Corporation. Radiation shield for a cathode ray tube. 4,392,083, Cl. 315-85.000.

Costruzioni Meccaniche Lonati S.p.A.: *See*—
Lonati, Francesco, 4,391,105, Cl. 66-138.000.

Cosyns, Jean; Juguin, Bernard; Le Page, Jean-Francois; and Miquel, Jean, to Institut Francais du Petrole. Process for upgrading olefinic $C_4$ cuts. 4,392,002, Cl. 585-329.000.

Cotten, George R.; and Medalia, Avrom I., to Cabot Corporation. Stabilized polypropylene compositions. 4,391,941, Cl. 524-495.000.

Cotteret, Jean: *See*—
Rosenbaum, Georges; Grollier, Jean F.; and Cotteret, Jean, 4,391,603, Cl. 8-424.000.

Couper, Robert A.; and Denning, Bruce S., to Pitney Bowes Inc. Print control circuit for a word processing system. 4,392,197, Cl. 364-200.000.

Courreges, Francis G., to National Semiconductor Corporation. MOS Integrated circuit having refractory metal or metal silicide interconnect layer. 4,392,150, Cl. 357-51.000.

Coury, Arthur J.: *See*—
Cahalan, Patrick T.; and Coury, Arthur J., 4,391,278, Cl. 128-640.000.

Cousins, Otto J., to Harper-Wyman Company. Rapid response thermal switch for isolated load control. 4,392,050, Cl. 219-491.000.

Coutures, Jean L.: *See*—
Benoit-Gonin, Roger; Berger, Jean L.; and Coutures, Jean L., 4,392,124, Cl. 340-347.0AD.

Covitch, Michael J.: *See*—
Baczek, Stanley K.; McCain, G. Howard; Benezra, Leo L.; and Covitch, Michael J., 4,391,844, Cl. 427-44.000.

Cowan, Frederick C. Fuel nozzle with concentric ignitor. 4,391,582, Cl. 431-266.000.

Cowden, James J., to RCA Corporation. Method and apparatus for holding styli. 4,391,696, Cl. 204-297.00W.

Craggs, Thomas A. Pumping apparatus for pumping liquids such as slurrys. 4,391,571, Cl. 417-403.000.

Cramp, Allan: *See*—
Neathway, Graham; Cramp, Allan; and Hum, Albert, 4,392,206, Cl. 364-900.000.

Crawford, Wheeler C.: *See*—
Sung, Rodney L.; Sweeney, William M.; and Crawford, Wheeler C., 4,391,610, Cl. 44-56.000.

Cregge, Robert J.: *See*—
Alexander, Catherine A.; Cregge, Robert J.; and Peet, Norton P., 4,391,806, Cl. 424-248.400.
Alexander, Catherine A.; Cregge, Robert J.; and Peet, Norton P., 4,391,807, Cl. 424-248.400.

Creusot-Loire: *See*—
Bonnor, Yannick; Raisson, Gerard; and Honnorat, Yves, 4,391,772, Cl. 419-23.000.

Creyf, Hubert S., to S.A. PRB n.v. Soil stabilizers and their preparation. 4,391,926, Cl. 523-132.000.

Crisler, John R.: *See*—
Forrester, Howard M.; and Crisler, John R., 4,391,515, Cl. 356-5.000.

Cronan, John M.; Haynes, Joseph M.; and Jones, Darrell D., to Dow Chemical Company, The. Safety device for ladder access opening to an elevated platform. 4,391,347, Cl. 182-113.000.

Crosby, Gary A., to Red Fox Industries, Inc. Marine sewage treatment with biological filter. 4,391,703, Cl. 210-151.000.

Cross, Alan: *See*—
Stevenson, John; Cross, Alan; and Anderson, John G., 4,391,642, Cl. 106-38.230.

Crossley, Roger, to John Wyeth and Brother Limited. Process for preparing 5H-pyrrolo[2,1-c]-[1,4]thiazepine-1,5-diones. 4,391,752, Cl. 260-239.30B.

Crowe, Laurie M.: *See*—
Gudnason, Geir V.; Crowe, Laurie M.; and Chang, Shin S., 4,391,830, Cl. 426-43.000.

Cruz, Mamerto M., Jr., to Morca, Inc. Readily hydratable cellulose and preparation thereof. 4,391,973, Cl. 536-56.000.

CTS Corporation: *See*—
Buss, Gary L., 4,392,030, Cl. 200-11.00R.

Cullis, Herbert M; and Stamminger, Reinhard, to Monegon, Ltd. Combined electrical and thermal solar collector. 4,392,008, Cl. 136-248.000.

Cummins, Donald L., to AMF Incorporated. Rotary drum dough divider. 4,391,576, Cl. 425-241.000.

Cunningham, Robert A., Jr.: *See*—
Cook, Kenneth V.; Cunningham, Robert A., Jr.; and Murrin, Horace T., 4,391,143, Cl. 73-623.000.

Curran, Dennis P.: *See*—
Kende, Andrew S.; Curran, Dennis P.; King, Margaret L.; and Feldstein, Neil A., 4,391,982, Cl. 549-433.000.

Curtis, Hazen, III, to Bell Telephone Laboratories, Incorporated. Miniature electrical switch. 4,392,031, Cl. 200-16.00R.

Cutter Laboratories, Inc.: *See*—
Mitra, Gautam; Coan, Michael H.; and Wada, Shohachi, 4,391,746, Cl. 260-112.00B.
Ng, Paul K.; and Fournel, Michael A., 4,391,801, Cl. 424-177.000.

CVI Incorporated: *See*—
Sarcia, Domenico S., 4,391,103, Cl. 62-6.000.

Czeschka, Franz. Spring strips for connections between printed circuit board. 4,391,482, Cl. 339-59.00M.

Cziment, Avi. Key with light in handle. 4,392,186, Cl. 362-116.000.

Czuba, Leonard F.; and Laurin, Dean G., to Baxter Travenol Laboratories Inc. Catheter hub assembly. 4,391,029, Cl. 29-450.000.

Dahmen, Hans: *See*—
Block, Hans-Dieter; and Dahmen, Hans, 4,391,761, Cl. 260-969.000.

Daimler-Benz Aktiengesellschaft: *See*—
Gaus, Hermann, 4,391,165, Cl. 74-869.000.

Dainippon Ink & Chemicals, Inc.: *See*—
Okoshi, Noboru; Kudo, Kin-ichi; and Shimoyama, Shoichi, 4,391,640, Cl. 106-29.000.

Daiwa Seiko Inc.: *See*—
Iwama, Shinichi; and Egasaki, Takashi, 4,391,419, Cl. 242-84.50A.

Dal-Craft, Inc.: *See*—
Dalbo, Lorraine E., 4,391,370, Cl. 206-574.000.

Dalbo, Lorraine E., to Dal-Craft, Inc. Embroidery project accessory carrying case. 4,391,370, Cl. 206-574.000.

Daman, Lloyd W.; and Shamp, Donald E., to Libbey-Owens-Ford Company. Fluid cooled burner structure. 4,391,581, Cl. 431-160.000.

Damon Corporation: *See*—
Lim, Franklin, 4,391,909, Cl. 435-178.000.

Dan T. Moore Co.: *See*—
Moore, Dan T., III; and Fischer, Michael F., 4,391,384, Cl. 220-359.000.

Daniel, Chelliah, to Ashland Oil, Inc. Oxydehydrogenation of isobutyric acid and its lower alkyl esters. 4,391,989, Cl. 562-599.000.

Daniel, Vernon T., to Burlington Industries, Inc. Non-contact infrared fabric temperature monitoring. 4,391,584, Cl. 432-8.000.

Daniels, William A.; and Zawadzki, Rainer K., to American Cyanamid Company. N-Denitration of N,2,6-trinitroanilines with phase transfer catalysts. 4,391,992, Cl. 564-441.000.

Das, Narayan; and Schaefer, Joy M., to Chemical Systems, Inc. Surface treatment for aluminum and aluminum alloys. 4,391,652, Cl. 148-6.15R.

Data Motion, Incorporated: *See*—
Seitz, Alan F., 4,391,399, Cl. 226-74.000.

Datak Corporation, The: *See*—
Pointon, David W., 4,391,853, Cl. 427-152.000.

David, Samuel: *See*—
Thies, Peter W.; and David, Samuel, 4,391,819, Cl. 424-278.000.

Davis, Chester A.: *See*—
Hsiung, Du Y.; Davis, Chester A.; and Nicholson, Harold J., 4,391,286, Cl. 132-7.000.

Davis, Lawrence C., Jr.: *See*—
Lesley, David J.; and Davis, Lawrence C., Jr., 4,391,934, Cl. 524-43.000.

Davis, William R. Cotton press. 4,391,186, Cl. 100-7.000.

Davy-Loewy Limited: *See*—
Gronbech, Robert W., 4,391,417, Cl. 242-78.600.

Davy McKee (Minerals & Metals) Limited: *See*—
Jackson, Ian D.; Berry, Derek; Rowden, George A.; and Dilley, Malcolm, 4,391,711, Cl. 210-634.000.

Davy McKee (Oil & Chemicals) Limited: *See*—
Harris, Norman; Flintoff, John F.; and Kippax, John W., 4,391,677, Cl. 203-28.000.

Day, William J.; and Weiss, Bernard J., to Raytheon Company. Self-cleaning microwave convection oven. 4,392,038, Cl. 219-10.55D.

Deare, Frederick A. Retractable tracted cart. 4,391,343, Cl. 180-198.000.

DeBar, David E., to International Business Machines Corporation. Randomly accessible memory display. 4,392,209, Cl. 365-110.000.

De Carlo, Leonard J., to Conoco Inc. Solvent foam stimulation of coal degasification well. 4,391,327, Cl. 166-307.000.

Deer, Carmine A.; and Cacossa, Frank G., to Sand and Sea Corporation. Spackeling composition. 4,391,647, Cl. 106-115.000.

Deere & Company: *See*—
Jacklin, Roger L., 4,391,157, Cl. 74-402.000.
Koning, Richard W.; Meiers, Gerald F.; and Anstey, Henry D., 4,391,187, Cl. 100-88.000.
Rice, Dennis A., 4,391,065, Cl. 49-465.000.

Degussa Aktiengesellschaft: *See*—
Spindler, Manfred; Tanner, Herbert; Geiger, Friedhelm; Bittner, Friedrich; and Martens, Jurgen, 4,391,987, Cl. 562-559.000.
Spindler, Manfred; Tanner, Herbert; Geiger, Friedhelm; Bittner, Friedrich; and Martens, Jurgen, 4,391,988, Cl. 562-559.000.
Zilske, Wolfgang; and Kuhn, Werner, 4,391,679, Cl. 204-43.00G.

Deibele, Florian C., to Tektronix, Inc. Quarter-turn fastener. 4,391,461, Cl. 292-204.000.

Del Giudice, Michel, to Thomson-CSF. Compact subharmonic mixer for EHF wave receiver using a single wave guide and receiver utilizing such a mixer. 4,392,255, Cl. 455-328.000.

DeLorean, John Z. Dither assisted steering. 4,391,340, Cl. 180-79.000.

Demny, Werner, to Friedrich Kocks GmbH & Company. Rolling mills and methods of rolling. 4,391,117, Cl. 72-224.000.

Demura, Takayuki: *See*—
Sawada, Hiroshi; and Demura, Takayuki, 4,391,256, Cl. 123-489.000.

Demus, Dietrich: *See*—
Kuschel, Frank; Demus, Dietrich; Pfeiffer, Doris; and Deutscher, Hans-Joachim, 4,391,730, Cl. 252-299.100.

de Niet, Edmond: *See*—
Rijckaert, Albert M. A.; de Niet, Edmond; and Beun, Jacobus P., 4,392,163, Cl. 360-76.000.

Denkler, Maria; and Braun, Frederic, to Diamalt Aktiengesellschaft. Desizing agent and process for preparation thereof. 4,391,745, Cl. 252-554.000.

Denley, Ronald S., to Oak Industries Inc. Method of making a membrane switch. 4,391,845, Cl. 427-58.000.

Denning, Bruce S.: *See*—
Couper, Robert A.; and Denning, Bruce S., 4,392,197, Cl. 364-200.000.

Dennis, James G.: *See*—
Jackson, G. C., Jr.; Bramlett, Kenneth W.; and Dennis, James G., 4,391,547, Cl. 403-341.000.

Dentsply Research & Development Corp.: *See*—
Dougherty, Emery W., 4,391,590, Cl. 433-90.000.

Depa S.p.A.: *See*—
Tarro, Giulio, 4,391,911, Cl. 435-239.000.

Depor Industries: *See*—
Geeck, Thurlow, 4,391,855, Cl. 427-383.700.

Derick, Burton N.; Moynihan, Robert E.; and Wolfe, Jon W., to Du Pont de Nemours, E. I., and Company. Polyvinyl butyral ink formulation. 4,391,867, Cl. 428-195.000.

Derks, Harry G., to Fleetwood Furniture Company. Wireless signaling system. 4,392,132, Cl. 340-825.140.

Desourteaux, Dominique E., to Societe Anonyme Francelco. Sealing sleeve for use with electrical connectors. 4,391,483, Cl. 339-94.00R.

Dettmers, Michael: *See*—
Weirich, Walter; Dettmers, Michael; Becker, Kunibert; and Rosenberg, Harry, 4,391,181, Cl. 91-29.000.

Deutsch, Albert: *See*—
Shimazu, Ken-ichi; and Deutsch, Albert, 4,391,894, Cl. 430-154.000.

Deutscher, Hans-Joachim: *See*—
Kuschel, Frank; Demus, Dietrich; Pfeiffer, Doris; and Deutscher, Hans-Joachim, 4,391,730, Cl. 252-299.100.

Devenyi, Tibor; Bocsa, Klara K.; Kovats, Ferenc; Pongor, Sandor; Szabolcsi, Gertrud; and Such, Mihaly, to MTA Szegedi Biologiai Kozpont Enzimologiai Intezete. Method of modifying the conformation of food and feed proteins. 4,391,839, Cl. 426-626.000.

De Vries, Adrian J., to Zenith Radio Corporation. Triple transit cancellation. 4,392,116, Cl. 333-194.000.

Diamalt Aktiengesellschaft: *See*—
Denkler, Maria; and Braun, Frederic, 4,391,745, Cl. 252-554.000.

Diamond Shamrock Corporation: *See*—
Baczek, Stanley K.; McCain, G. Howard; Benezra, Leo L.; and Covitch, Michael J., 4,391,844, Cl. 427-44.000.
Marcellis, Alphonso W.; and Johnson, Grannis S., 4,391,645, Cl. 106-90.000.

Didier-Werke A.G.: *See*—
Jeschke, Peter; and Plath, Jurgen, 4,391,392, Cl. 222-598.000.

Diederichs, Rolf, to Krautkramer-Branson, Inc. Ultrasonic test probe. 4,391,144, Cl. 73-629.000.

Diel, Hartmut: *See*—
Bindernagel, Ali; Holthoff, Helmut; and Diel, Hartmut, 4,391,357, Cl. 192-94.000.

Diesch, Robert E., to Pako Corporation. Slide mounter with film curl accommodator. 4,391,082, Cl. 53-520.000.

Diesel Kiki Co., Ltd.: *See*—
Abe, Yoshiaki; Kubota, Yutaka; and Sugimoto, Hitoshi, 4,391,237, Cl. 123-179.00H.

Digital Equipment Corporation: *See*—
Arulpragasam, Jega A.; Giggi, Robert A.; Lary, Richard F.; and Sullivan, Daniel T., 4,392,200, Cl. 364-200.000.

Dilley, Malcolm: *See*—
Jackson, Ian D.; Berry, Derek; Rowden, George A.; and Dilley, Malcolm, 4,391,711, Cl. 210-634.000.

Dillon, Peter L. P.: *See*—
Garcia, Enrique; and Dillon, Peter L. P., 4,392,157, Cl. 358-213.000.

Di Matteo, Paul, to Solid Photography, Inc. Arrangement for scanning points in space. 4,392,182, Cl. 362-5.000.

Dindima Group Pty. Ltd., The: *See*—
Bruggemann, Harro, 4,392,123, Cl. 340-347.0AD.

Discovision Associates: *See*—
Morrison, Rocky V., 4,391,579, Cl. 425-548.000.

Disctron, Inc.: *See*—
Wright, Harold T., 4,392,165, Cl. 360-105.000.

Dittmar, Walter: *See*—
Blume, Ernst; Schaper, Wolfgang; Raether, Wolfgang; and Dittmar, Walter, 4,391,805, Cl. 424-246.000.

Doan, Robert L. Extendable torch guide. 4,391,433, Cl. 266-77.000.

Dobrynin, Vladimir E.: *See*—
Garkusha, Anatoly V.; and Dobrynin, Vladimir E., 4,391,564, Cl. 415-126.000.

Dockal, Ronald J., to Burroughs Corporation. Card reader-data link processor. 4,392,207, Cl. 364-900.000.

Dodge, Paul A. Bowstring release device. 4,391,263, Cl. 124-35.00A.

Doherty, Charles H., III, to Du Pont de Nemours, E. I., and Company. Apparatus for restringing multiple threadlines. 4,391,086, Cl. 57-22.000.

Doherty, Niall S.: *See*—
Harrison, Boyd L.; and Doherty, Niall S., 4,391,818, Cl. 424-277.000.

Dohshita, Hidetoshi; Ishii, Yoshiya; and Fujitani, Nobuyuki, to Nippondenso Co., Ltd. Stopping device for engine supplied with fuel by fuel injection pump. 4,391,241, Cl. 123-198.0DB.

Don, Johannes A.; and Scholten, Joseph J. F., to Stamicarbon, B.V. Process for the preparation of a cycloalkene through partial hydrogenation of the corresponding aromatic hydrocarbon. 4,392,001, Cl. 585-269.000.

Dondelewski, Michael A. Process for the beneficiation of carbonous materials with the aid of ultrasound. 4,391,608, Cl. 44-1.0SR.

Dorina Nahmaschinen GmbH: *See*—
Holl, Helmar; and Kessler, Rolf, 4,391,214, Cl. 112-269.100.

Dougherty, Edward C., to Centronics Data Computer Corporation. Within-line color change printing. 4,391,540, Cl. 400-212.000.

Dougherty, Emery W., to Dentsply Research & Development Corp. Cartridge for viscous material. 4,391,590, Cl. 433-90.000.

Dow Chemical Company, The: *See*—
Alexander, Catherine A.; Cregge, Robert J.; and Peet, Norton P., 4,391,806, Cl. 424-248.400.
Alexander, Catherine A.; Cregge, Robert J.; and Peet, Norton P., 4,391,807, Cl. 424-248.400.
Au, Andrew T., 4,391,630, Cl. 71-105.000.
Cronan, John M.; Haynes, Joseph M.; and Jones, Darrell D., 4,391,347, Cl. 182-113.000.
Pimlott, John R., 4,391,693, Cl. 204-237.000.

Dow Corning Corporation: *See*—
Falender, James R.; and McHale, Angelika H., 4,391,937, Cl. 524-119.000.
Johnson, Robert D., 4,391,921, Cl. 521-66.000.
Lee, Chi-long; and Spells, Sherwood, 4,391,765, Cl. 264-26.000.

Downes, Peter B., to DSH. Corner connector for sliding doors. 4,391,019, Cl. 16-105.000.

Drach, John E., to Scott Paper Company. Wet strength resins. 4,391,878, Cl. 428-479.600.

Dragerwerk Aktiengesellschaft: *See*—
Hinz, Claus-Dieter; and Pasternack, Adalbert, 4,390,997, Cl. 2-81.000.

Dreier, Ernst; and Spring, Kurt, to Fritz Gegauf Aktiengesellschaft Bernina-Nachmaschinenfabrik. Needle thread guide device. 4,391,213, Cl. 112-246.000.

Drescher, Robert D.: *See*—
Stanton, William E.; Eisenhaure, David B.; and Drescher, Robert D., 4,392,100, Cl. 318-803.000.

Dresser Industries, Inc.: *See*—
Greenlee, Donald R., 4,391,326, Cl. 166-240.000.
Jackson, G. C., Jr.; Bramlett, Kenneth W.; and Dennis, James G., 4,391,547, Cl. 403-341.000.
Michael, David J.; and Wishon, Berhl E., 4,391,917, Cl. 501-100.000.

Drinon, Alva C., to Weyerhaeuser Company. Container. 4,391,405, Cl. 229-31.00R.

Drost, Cornelis J.; and Milanowski, G. Jan, to Cornell Research Foundation, Inc. Electroacoustic transducer calibration method and apparatus. 4,391,124, Cl. 73-1.0DV.

DSH: *See*—
Downes, Peter B., 4,391,019, Cl. 16-105.000.

D'Sidocky, Richard M., to Goodyear Tire & Rubber Company, The. Reduction of cyclopentadiene from isoprene streams. 4,392,004, Cl. 585-820.000.

Dubois, Francois Y.: *See*—
Dubois, Yves; and Dubois, Francois Y., 4,392,061, Cl. 290-53.000.

Dubois, Yves; and Dubois, Francois Y. Apparatus for utilizing the energy of wave swells and waves. 4,392,061, Cl. 290-53.000.

Duca, James F.; and Moline, Jerry A., to Ampex Corporation. Video key edge generator for increasing the size of an associated border, drop shadow and/or outline. 4,392,156, Cl. 358-183.000.

Ducasse, Joseph C. V.: *See*—
Casey, John A.; and Ducasse, Joseph C. V., 4,391,026, Cl. 29-121.600.

Dudley, Raymond. Electronic chess game. 4,391,447, Cl. 273-238.000.

Dumortier, Bernard: *See*—
Cadet, Christian; Dumortier, Bernard; and Souques, Georges, 4,392,174, Cl. 361-45.000.

Duncan, Jeffrey B.; and Bolton, Joseph A., to Albany International Corp. Basementless separator system. 4,391,673, Cl. 162-217.000.

Dupain, Jean, to Societe des Ciments Francais. Automatic device for making samples for analysis. 4,391,774, Cl. 422-63.000.

Du Pont de Nemours, E. I., and Company: *See*—
Derick, Burton N.; Moynihan, Robert E.; and Wolfe, Jon W., 4,391,867, Cl. 428-195.000.
Doherty, Charles H., III, 4,391,086, Cl. 57-22.000.
Foederer, Wilhelmus T. M., 4,391,484, Cl. 339-97.00P.
Harrell, Jerald R., 4,391,922, Cl. 521-88.000.
Harris, John F., Jr., 4,391,966, Cl. 528-176.000.
Hawkins, William E., 4,391,127, Cl. 73-37.700.
Levitt, George, 4,391,627, Cl. 71-90.000.
Nair, Kumaran M., 4,392,180, Cl. 361-321.000.
Olson, Allan H., 4,391,930, Cl. 523-219.000.
Rys-Sikora, John, 4,391,923, Cl. 521-96.000.
Sysak, Peter K., 4,391,903, Cl. 430-629.000.
Waggoner, Marion G., 4,391,936, Cl. 524-89.000.

Durette, Philippe L.; and Shen, Tsung-Ying, to Merck & Co., Inc. Immunologically active peptidyl disaccharides and methods of preparation. 4,391,800, Cl. 424-177.000.

Durr, Dieter: *See*—
Maier, Ludwig; and Durr, Dieter, 4,391,624, Cl. 71-86.000.

Dursch Friedrich: *See*—
Wang, Yu-Chang J.; Dursch Friedrich; O'Laughlin, Richard L.; and Prusik, Thaddeus, 4,391,755, Cl. 260-397.450.

Dybas, Richard A.; Grier, Nathaniel; and Witzel, Bruce E., to Merck & Co., Inc. 2-(Substitutedpiperidylmethyl) propane nitriles and compositions thereof. 4,391,812, Cl. 424-267.000.

E. R. Squibb & Sons, Inc.: *See*—
Wang, Yu-Chang J.; Dursch Friedrich; O'Laughlin, Richard L.; and Prusik, Thaddeus, 4,391,755, Cl. 260-397.450.

Eastman Kodak Company: *See*—
Cavagnaro, William A., 4,391,509, Cl. 355-14.0FU.
Frishberg, Mark D.; and Krutak, James J., Sr., 4,391,886, Cl. 430-41.000.
Garcia, Enrique; and Dillon, Peter L. P., 4,392,157, Cl. 358-213.000.
Hook, Richard J.; and Rule, Mark, 4,391,985, Cl. 562-414.000.
Maier, Thomas O.; and Richards, Jack L., 4,391,896, Cl. 430-223.000.

Eaton Corporation: *See*—
Kolb, Arthur F.; Franklin, Arthur J.; and Miller, Toby I., 4,392,118, Cl. 337-154.000.

Ebauches Electroniques, S.A.: *See*—
Freer, William G.; Varney, John C.; and Williamson, John H., 4,391,491, Cl. 350-341.000.
Kumar, Niraj; and Mouthon, Marc, 4,392,217, Cl. 368-188.000.

Eberle, John. Golf ball dispenser. 4,391,446, Cl. 273-201.000.

Eckardt, Peter; and Voetz, Franz J., to Hoechst Aktiengesellschaft. Shaped articles made from expanded minerals. 4,391,644, Cl. 106-85.000.

Eckels, Calvin; and James, John, to Time and Frequency Technology, Inc. Attention signal receiver for emergency broadcast systems. 4,392,248, Cl. 455-161.000.

Ecklund, Lawrence M., to Motorola Inc. Mechanical tuner with microphonics elimination circuitry. 4,392,254, Cl. 455-173.000.

Ederle, John A.; Hoer, Ralph A.; and Irwin, George H., to Ralston Purina Company. Process for preparing meat products containing a protein extender with titanium dioxide tracer. 4,391,840, Cl. 426-641.000.

Edinger, Egon; and Kohler, Gerd, to Siemens Aktiengesellschaft. Method of manufacture of identical parts displaying different indicia. 4,391,764, Cl. 264-25.000.

Edison International, Inc.: *See*—
Brown, Rollin G., 4,391,847, Cl. 427-106.000.

Edstrom, Lars G., to Malmohus Invest AB. Method and apparatus for calibration and adjustment of inserter for sheeted material. 4,391,439, Cl. 271-90.000.

Edwards, Elgin: *See*—
Tyler, Truman V.; and Sprague, Robert B., 4,391,712, Cl. 210-652.000.

Egami, Masafumi: *See*—
TateBe, Yoshikazu; Egami, Masafumi; and Miyawaki, Toshimitsu, 4,391,231, Cl. 123-41.690.

Egami, Tsuneyuki; Kawai, Hisasi; Kohama, Tokio; and Obayashi, Hideki, to Nippon Soken, Inc. Gas flow measuring apparatus. 4,391,132, Cl. 73-118.000.

Egasaki, Takashi: *See*—
Iwama, Shinichi; and Egasaki, Takashi, 4,391,419, Cl. 242-84.50A.

Egashira, Yuji: *See*—
Mabuchi, Minoru; Sakai, Kiyoshi; Ishikawa, Shozo; Egashira, Yuji; and Kitahara, Makoto, 4,391,889, Cl. 430-59.000.

Eggett, Janet M.: *See*—
Kuch, Philip L.; Herrington, Daniel R.; and Eggett, Janet M., 4,391,756, Cl. 260-430.000.

Eguchi, Yasukata: *See*—
Tamiya, Yoshimichi; Eguchi, Yasukata; and Makabe, Hachiro, 4,391,212, Cl. 112-158.00E.

Eheim, Franz, to Robert Bosch GmbH. Fuel injection pump for internal combustion engines. 4,391,257, Cl. 123-503.000.

Ehrentraut, Franz-Josef: *See*—
Bianchi, Valerio; Ehrentraut, Franz-Josef; and Wobky, Peter, 4,391,249, Cl. 123-438.000.

Eigen, Edward: *See*—
Tavss, Edward A.; and Eigen, Edward, 4,391,798, Cl. 424-52.000.

Einem, Robert E., to International Telephone & Telegraph Corp. Mosaic printer and ribbon guide therefor. 4,391,541, Cl. 400-248.000.

Eisenhaure, David B.: *See*—
Stanton, William E.; Eisenhaure, David B.; and Drescher, Robert D., 4,392,100, Cl. 318-803.000.

Electric Power Research Institute, Inc.: *See*—
Huber, Calvin O.; Schick, Karl G.; and Coburn, Joel T., 4,391,775, Cl. 422-68.000.

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Beck, Theodore R., 4,391,450, Cl. 277-1.000.

Eli Lilly and Company: *See*—
Mills, Jack; Schmiegel, Klaus K.; and Shaw, Walter N., 4,391,826, Cl. 424-324.000.

Ellett, James R., to Bralorne Resources Limited. Sampler. 4,391,152, Cl. 73-863.840.

Elliott, David G.: *See*—
Rand, Robert W.; Snow, Harold D.; Elliott, David G.; and Haskins, Glenn M., 4,392,040, Cl. 219-10.710.

Ellis, Earle R., to Monsanto Company. Spray-suppression device. 4,391,870, Cl. 428-218.000.

El-Menshawy, Mohamed F.; Woodrow, Peter A.; and Bhattacharyya, Sushantha K., to National Research Development Corporation. Methods and apparatus for monitoring the condition of dielectric liquid in electric discharge machining. 4,392,110, Cl. 324-453.000.

Elpan ApS: *See*—
Keldmann, Erik C. V., 4,391,913, Cl. 236-36.000.

Elsing, John W., to Magnetic Peripherals Inc. Quick disconnect pack. 4,391,543, Cl. 403-24.000.

Elslager, Edward F., to Warner-Lambert Company. Methods for treating psoriasis. 4,391,809, Cl. 424-251.000.

Embro, Joseph J.: *See*—
Brody, Aaron L.; Embro, Joseph J.; and Young, William E., 4,391,080, Cl. 53-426.000.

Emerson Electric Company: *See*—
Wicke, Charles A.; and Riley, Wayne C., 4,391,459, Cl. 285-238.000.

Emich, Werner, to Friedrich Sanner GmbH & Co. KG. Container having a safety closure. 4,391,382, Cl. 215-213.000.

Engel, Herbert; and Boettger, Horst, to Messerschmitt-Bolkow-Blohm Gesellschaft mit Beschrankter Haftung. Destructable air inlet cover for rocket engines. 4,391,094, Cl. 60-245.000.

Engen, Gudmund: *See*—
Jacobsen, Kjell O.; and Engen, Gudmund, 4,391,197, Cl. 102-334.000.

Engvall, Eva S.; and Ruoslahti, Erkki I., to La Jolla Cancer Research Foundation. Method for the purification of collagens. 4,391,749, Cl. 260-123.700.

Envirotech Corporation: *See*—
Cook, Lynn W.; and Brown, David P., 4,391,705, Cl. 210-218.000.

Essilor International: *See*—
Hennequin, Jean-Claude, 4,391,527, Cl. 356-375.000.

Estopinal, Earl J., to Columbian Chemicals Company. Carbon black process. 4,391,789, Cl. 423-457.000.

Etat Francais: *See*—
Auge, Claude, 4,391,198, Cl. 102-401.000.

Ethyl Corporation: *See*—
Shin, Kju H., 4,391,977, Cl. 544-277.000.

Eutectic Corporation: *See*—
Rotolico, Anthony J.; Romero, Eduardo; and Lyons, John E., 4,391,860, Cl. 427-423.000.

Evans, Anthony C., to Kelsey-Hayes Company. Sliding caliper disc brake. 4,391,355, Cl. 188-73.440.

Evans, John M., to Beecham Group Limited. Cyanobenzano[b]pyrans. 4,391,815, Cl. 424-274.000.

Ex-Cell-O Corporation: *See*—
Fleury, James C., 4,391,027, Cl. 29-157.30B.

Exxon Production Research Co.: *See*—
Ortloff, John E., 4,391,298, Cl. 137-615.000.

Exxon Research & Engineering Co.: *See*—
Brois, Stanley J.; and Gutierrez, Antonio, 4,391,981, Cl. 549-252.000.
Langer, Arthur W., Jr., 4,391,738, Cl. 252-429.00B.
Mintz, Donald; and Irani, Cyrus A., 4,391,925, Cl. 523-130.000.
Napoli, Joseph D., 4,392,009, Cl. 136-251.000.
Parkola, Walter R., 4,392,145, Cl. 346-140.00R.
Small, Augustus B.; Hughes, Vincent L.; and Benitez, Francisco M., 4,391,961, Cl. 526-76.000.
Wagner, John P., 4,391,698, Cl. 204-302.000.

F. L. Smidth & Co.: *See*—
Petersen, Helge H., 4,391,207, Cl. 110-342.000.

Fabcon Incorporated: *See*—
Casey, John A.; and Ducasse, Joseph C. V., 4,391,026, Cl. 29-121.600.

Fabian, Peter; and Muller, Theo, to W. C. Heraeus GmbH. Gravure printing base cylinder, and method of its manufacture. 4,391,879, Cl. 428-551.000.

Fagerstedt, Nils, to Oy Sisu-Auto Ab. Tractor vehicle provided with a fifth-wheel plate. 4,391,455, Cl. 280-407.000.

Fahmy, Mohamed A., to Rhone-Poulenc Agrochimie. S-(Tertiary alkyl) alkylphosphonothioic halides. 4,391,760, Cl. 260-961.000.

Falender, James R.; and McHale, Angelika H., to Dow Corning Corporation. Color stable chelated titanate compositions. 4,391,937, Cl. 524-119.000.

Falk, John C.; and Juang, Mike S. D., to Borg-Warner Chemicals, Inc. Emulsion/suspension ASA graft copolymers as flow modifiers for PVC. 4,391,948, Cl. 525-57.000.

Falkenburg, Hans R.; Krause, Siegfried; and McGuiness, Robert C., to Imperial Chemical Industries PLC; and Hermann Wiederhold G.m.b.H. Corp. Curing agents. 4,391,965, Cl. 528-112.000.

Fankhauser, Franz; van der Zypen, Eugen; and Roussel, Philippe, to Lasag AG. Method for the surgical treatment of the eye. 4,391,275, Cl. 128-303.100.

Fardin, Carlos, to Van Dam Machine Corporation of America. Lid infeed for spinning rod restacker. 4,391,560, Cl. 414-107.000.

Farmer, Robert F., III, to Gillette Company, The. Erasable inks containing thermoplastic block copolymers. 4,391,927, Cl. 523-161.000.

Faure, Jean-Paul: *See*—
Lecron, Jacques; Manera, Maxime; Faure, Jean-Paul; and Renaudin, Jean-Pierre, 4,391,618, Cl. 65-1.000.

Faust, Wilfried: *See*—
Stetter, Jorg; Reiser, Wolf; and Faust, Wilfried, 4,391,626, Cl. 71-88.000.

Fauth, Karl-Heinz; Mohr, Heinrich; and Immel, Wolfgang, to BASF Aktiengesellschaft. Polymerization of isobutylene. 4,391,959, Cl. 526-70.000.

Favara, Louis J.: *See*—
Tyler, Truman V.; and Sprague, Robert B., 4,391,712, Cl. 210-652.000.

Fayren, Jose M., to Astilleros y Talleres del Noroeste, S.A. Offshore facility for recovery hydrocarbon deposits from deep sea beds. 4,391,332, Cl. 166-350.000.

Feldman, Arthur E.: *See*—
Marsh, Douglas D.; Feldman, Arthur E.; and Newlin, John C., 4,391,454, Cl. 280-47.350.

Feldmann, William L.; Rowell, John M.; and Schmidt, Paul H., to Bell Telephone Laboratories, Incorporated. Manufacture of niobium-aluminum superconducting material. 4,391,657, Cl. 148-133.000.

Feldstein, Neil A.: *See*—
Kende, Andrew S.; Curran, Dennis P.; King, Margaret L.; and Feldstein, Neil A., 4,391,982, Cl. 549-433.000.

Fenner, Gary R.: *See*—
Gwathney, Kenneth W.; Gann, David L.; Seagraves, Steven G., Sr.; Fenner, Gary R.; and Fenner, Gordon H., 4,391,188, Cl. 100-229.00A.

Fenner, Gordon H.: *See*—
Gwathney, Kenneth W.; Gann, David L.; Seagraves, Steven G., Sr.; Fenner, Gary R.; and Fenner, Gordon H., 4,391,188, Cl. 100-229.00A.

Ferguson, Stewart. Roof or sidewall construction. 4,391,076, Cl. 52-553.000.

Ferreira, Laurence E.; Lamar, Richard S.; and Bertolacini, Ralph J., to Standard Oil Company (Indiana). Mineral treatment and composition. 4,391,734, Cl. 252-378.00R.

Ferreira, Laurence E.: *See*—
Lamar, Richard S.; Ferreira, Laurence E.; and Cloud, Robert C., 4,391,733, Cl. 252-378.00R.

Ferrero, Aldo. Process for preparing palatable soya proteins and product thus obtained. 4,391,748, Cl. 260-123.500.

Ferrill, Richard M., Jr., to Ciba-Geigy Corporation. Particulate pigment compositions. 4,391,648, Cl. 106-308.00M.

Fette, Bruce, to Motorola Inc. Speech synthesizer with smooth linear interpolation. 4,392,018, Cl. 179-1.0SM.

Fiat Auto S.p.A.: *See*—
Piano, Renzo, 4,391,465, Cl. 296-208.000.

Fields, Ellis K.: *See*—
Nimry, Tayseer S.; and Fields, Ellis K., 4,391,967, Cl. 528-189.000.

Fifolt, Michael J.: *See*—
Mundhenke, Rudolph F.; and Fifolt, Michael J., 4,391,991, Cl. 564-412.000.

Filmyer, Wm. G., to Pioneer De-Icing Services, Inc. Wetted salt system including adjustable timer. 4,391,393, Cl. 222-642.000.

Finlayson, Claude M.: *See*—
Mardia, Wilbur S.; and Finlayson, Claude M., 4,391,637, Cl. 106-20.000.

Finn, Roger C.: *See*—
Trumble, William P.; Finn, Roger C.; and Jackson, Charles F. C., 4,392,014, Cl. 174-92.000.

Finnegan, Charles C., to LeLasso Corporation. Resilient clamp for supporting articles. 4,391,376, Cl. 211-60.0SK.

Fiscella, James T., to TJT Food Flavoring, Inc. Method of extending and flavoring ice milk or cream. 4,391,834, Cl. 426-565.000.

Fischer, Klaus: *See*—
Albrecht, Werner; Fischer, Klaus; and Grun, Gerhard, 4,392,136, Cl. 340-825.560.

Fischer, Michael F.: *See*—
Moore, Dan T., III; and Fischer, Michael F., 4,391,384, Cl. 220-359.000.

Fischer & Porter Company: *See*—
Anderson, Arthur, 4,391,704, Cl. 210-188.000.
Herzl, Peter J., 4,391,149, Cl. 73-861.250.

Fischer, Rudolf, to Albert-Frankenthal AG. Folder. 4,391,596, Cl. 493-425.000.

Fischer, William C.; Adams, Don L.; Verzella, David J.; and Wright, Stuart C., to United Technologies Corporation. Aircraft coordinated turn with lagged roll rate. 4,392,203, Cl. 364-434.000.

Fishbaugh, Byron L., to Goodyear Tire & Rubber Company, The. Resilient mounting. 4,391,436, Cl. 267-141.100.

Fisher, Denys. Drawing instrument or apparatus. 4,391,045, Cl. 33-27.00L.

Fitch, Arthur H.: *See*—
Zucker, Joseph; and Fitch, Arthur H., 4,391,517, Cl. 356-73.100.

Fitz, Herbert: *See*—
Kuhls, Jurgen; Mayer, Franz; and Fitz, Herbert, 4,391,940, Cl. 524-458.000.

Flanagan, G. Patrick. Method of purifying air and negative field generator. 4,391,773, Cl. 422-22.000.

Fleetwood Furniture Company: *See*—
Derks, Harry G., 4,392,132, Cl. 340-825.140.

Fleischer, Henry: *See*—
Talerico, Joseph M.; and Fleischer, Henry, 4,391,003, Cl. 4-415.000.

Fleming, Anthony, to Burroughs Corporation. Stabilized button for an electrical keyboard. 4,392,037, Cl. 200-340.000.

Fletcher Timber Limited: *See*—
Giess, Hans J., 4,391,077, Cl. 52-747.000.

Fleury, James C., to Ex-Cell-O Corporation. Method of making a heat exchanger assembly. 4,391,027, Cl. 29-157.30B.

Flintoff, John F.: *See*—
Harris, Norman; Flintoff, John F.; and Kippax, John W., 4,391,677, Cl. 203-28.000.

FMC Corporation: *See*—
Knight, Houston W., 4,391,297, Cl. 137-615.000.
Krynock, Robert A., 4,391,374, Cl. 209-540.000.
Stanley, Robert C., 4,391,185, Cl. 99-489.000.

Foederer, Wilhelmus T. M., to Du Pont de Nemours, E. I., and Company. Box connector. 4,391,484, Cl. 339-97.00P.

Fogarty, A. Edward; and Fogarty, Bonnie R. Musical toy. 4,391,061, Cl. 46-44.000.

Fogarty, Bonnie R.: *See*—
Fogarty, A. Edward; and Fogarty, Bonnie R., 4,391,061, Cl. 46-44.000.

Fogelberg, Ernst R., to AB Bonnierforetagen. Process and a composition for the insulation of surfaces, and product hereby obtained. 4,391,859, Cl. 427-421.000.

Folcher, Gerard; and Paris, Jacques, to Commissariat a l'Energie Atomique. Photogalvanic cell. 4,391,881, Cl. 429-111.000.

Foley, James W. B.; and Osterhout, David J., to General Electric Company. Reactive snubber for inductive load clamp diodes. 4,392,172, Cl. 361-8.000.

Folkman, Moses J.; and Langer, Robert S., Jr., to Children's Hospital Medical Center, The. Systems for the controlled release of macromolecules. 4,391,797, Cl. 424-19.000.

Ford Aerospace & Communications Corporation: *See*—
Rubin, Michael D., 4,392,173, Cl. 361-35.000.

Ford, Franklin C.; Hill, Gilman A.; and Vincent, Coye T. High-velocity jet and propellant fracture device for gas and oil well production. 4,391,337, Cl. 175-4.600.

Foresman, Samuel U. Holder for a bar of soap. 4,391,427, Cl. 248-176.000.

Forjas Taurus S/A: *See*—
Bornancini, Jose C. M., 4,391,056, Cl. 42-62.000.
Bornancini, Jose C. M., 4,391,057, Cl. 42-65.000.

Forrester, Howard M.; and Crisler, John R., to United States of America, Navy. Optical transmitter/receiver apparatus sharing common optics. 4,391,515, Cl. 356-5.000.

Forster, Siegfried; Quell, Peter; and Jaegers, Huber, to Kernforschungsanlage Julich GmbH. Fluid-heating apparatus. 4,391,227, Cl. 122-16.000.

Foseco International Limited: *See*—
Stevenson, John; Cross, Alan; and Anderson, John G., 4,391,642, Cl. 106-38.230.

Fournel, Michael A.: *See*—
Ng, Paul K.; and Fournel, Michael A., 4,391,801, Cl. 424-177.000.

Fowler, James C.: *See*—
Coon, Julian B.; Fowler, James C.; Payton, Charles E.; and Waters, Kenneth H., 4,391,336, Cl. 175-45.000.

Fox, Austin L., to Molins Limited. Packing machine. 4,391,083, Cl. 53-575.000.

Frady, Dale A.; and Frady, David C., to Frontier Homes, Inc. Log wall construction for log home. 4,391,067, Cl. 52-97.000.

Frady, David C.: *See*—
Frady, Dale A.; and Frady, David C., 4,391,067, Cl. 52-97.000.

Framatome: *See*—
Marini, Jean; and Audenard, Bernard, 4,392,214, Cl. 367-127.000.

Franklin, Arthur J.: *See*—
Kolb, Arthur F.; Franklin, Arthur J.; and Miller, Toby I., 4,392,118, Cl. 337-154.000.

Franz Buttner AG: *See*—
Muller, Michael; Scherrer, Herbert; and Kagi, Erwin, 4,391,536, Cl. 400-144.200.

Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.: *See*—
Theurer, Josef; Hansmann, Johann; and Riensberger, Klaus, 4,391,134, Cl. 73-146.000.

Freeman, Wallace L., to United States of America, Army. Methods of making infrared detector array cold shield. 4,391,678, Cl. 204-15.000.

Freer, William G.; Varney, John C.; and Williamson, John H., to Ebauches Electroniques, S.A. Passive electro-optic display cell and method of manufacturing thereof. 4,391,491, Cl. 350-341.000.

Freese, Lennart: *See*—
Broms, Stig; and Freese, Lennart, 4,391,183, Cl. 91-461.000.

Frenkel, Jacob K.; and Smith, Donald D., to Kansas University Endowment Association. Method for preventing cats from shedding Toxoplasma oocysts after infection of such cats. 4,391,822, Cl. 424-283.000.

Frey, Werner: *See*—
Kleine, Willi; and Frey, Werner, 4,391,960, Cl. 526-74.000.

Fried, Morton. Power saving system which assures room security. 4,391,406, Cl. 236-47.000.

Friedrich Kocks GmbH & Company: *See*—
Bindernagel, Ali; Holthoff, Helmut; and Diel, Hartmut, 4,391,357, Cl. 192-94.000.
Demny, Werner, 4,391,117, Cl. 72-224.000.

Friedrich Sanner GmbH & Co. KG: *See*—
Emich, Werner, 4,391,382, Cl. 215-213.000.

Friemann & Wolf GmbH: *See*—
Grossmann, Karl; and Mullejans, Robert, 4,392,185, Cl. 362-105.000.

Frind, Gerhard; Carroll, James J.; and Van Noy, John H., to General Electric Company. Vacuum interrupter. 4,392,035, Cl. 200-144.00B.

Frishberg, Mark D.; and Krutak, James J., Sr., to Eastman Kodak Company. Methine colorant materials and the use thereof in electrophoretic migration imaging layers and processes. 4,391,886, Cl. 430-41.000.

Fritz Gegauf Aktiengesellschaft Bernina-Naehmaschinenfabrik: *See*—
Dreier, Ernst; and Spring, Kurt, 4,391,213, Cl. 112-246.000.

Frola, Frank V., to Westinghouse Electric Corp. Rectifying and inverting apparatus. 4,392,193, Cl. 363-128.000.

Frommer, Werner: *See*—
Baumgarten, Jorg; Frommer, Werner; Schmidt, Delf; Schmidt, Friedrich; and Munnecke, Douglas M., 4,391,887, Cl. 435-42.000.

Fromson, Howard A.: *See*—
Gracia, Robert F.; and Fromson, Howard A., 4,391,897, Cl. 430-302.000.

Frontier Homes, Inc.: *See*—
Frady, Dale A.; and Frady, David C., 4,391,067, Cl. 52-97.000.

Fuji Jukogyo Kabushiki Kaisha: *See*—
Matsui, Fujio, 4,391,250, Cl. 123-438.000.

Fuji Oil Company, Limited: *See*—
Katayama, Tsutomu; and Nakanishi, Toyohiko, 4,391,835, Cl. 426-573.000.

Fuji Photo Film Co., Ltd.: *See*—
Toyoda, Takashi; Shishido, Tadao; and Tsujikawa, Teruaki. 4,391,900, Cl. 430-355.000.
Yamada, Yasuyuki; Akashi, Goro; Tsuji, Nobuo; Mukaida, Yoshito; and Fujiyama, Masaaki, 4,391,851, Cl. 427-130.000.
Yamamoto, Nobuyuki; Naruo, Kyoichi; and Okita, Tsutomu, 4,391,874, Cl. 428-336.000.

Fujihara, Katsumi: *See*—
Mita, Kikuo; Oyama, Masayuki; Yoshida, Takashi; Nakashima, Masato; Fujihara, Katsumi; and Nakakuki, Tadao, 4,392,120, Cl. 382-22.000.

Fujiki, Makoto, to Canon Kabushiki Kaisha. Range finding optical mechanism. 4,391,513, Cl. 356-1.000.

Fujimura, Akira: *See*—
Kawabata, Etsuo; Ogura, Masahiko; Takagi, Akinobu; and Fujimura, Akira, 4,391,246, Cl. 123-391.000.

Fujinami, Kimiya: *See*—
Minato, Ichiro; Shibata, Koichi; and Fujinami, Kimiya, 4,391,958, Cl. 525-504.000.

Fujioka, Masanobu: *See*—
Mori, Hiromichi; Matsumoto, Jun; and Fujioka, Masanobu, 4,392,224, Cl. 370-67.000.

Fujitani, Nobuyuki: *See*—
Dohshita, Hidetoshi; Ishii, Yoshiya; and Fujitani, Nobuyuki, 4,391,241, Cl. 123-198.0DB.

Fujitsu Limited: *See*—
Hirano, Yutaka, 4,392,152, Cl. 357-80.000.
Hirao, Hiroshi, 4,392,066, Cl. 307-290.000.
Miyasaka, Kiyoshi; and Higuchi, Mitsuo, 4,392,212, Cl. 365-230.000.
Nakano, Masao; Baba, Fumio; Nakano, Tomio; Takemae, Yoshihiro; and Mochizuki, Hirohiko, 4,392,211, Cl. 365-200.000.

Fujiyama, Masaaki: *See*—
Yamada, Yasuyuki; Akashi, Goro; Tsuji, Nobuo; Mukaida, Yoshito; and Fujiyama, Masaaki, 4,391,851, Cl. 427-130.000.

Funk, Erwin D., to Kamyr, Inc. Method and apparatus for recovering mineral nodules from the ocean floor. 4,391,468, Cl. 299-8.000.

Furukawa Electric Co., Ltd., The: *See*—
Hori, Hisako; Kitazuru, Nobu; Shirahata, Isao; and Nakamura, Nobuyuki, 4,391,955, Cl. 525-462.000.

Fusco, Gerard A.; and van Lier, Glenn, to J. M. Huber Corporation. Method for reclaiming ink waste. 4,391,638, Cl. 106-20.000.

Fushida, Akira: *See*—
Kamezaki, Yasushi; Inoue, Eiichi; Nishihama, Hitoshi; Fushida, Akira; and Matsumoto, Joji, 4,391,892, Cl. 430-126.000.

Fussi, Fernando F., to Hepar Industries. Adrenosteriod composition and method for the treatment of shock by infusional therapy. 4,391,803, Cl. 424-239.000.

G&D, Inc.: *See*—
Levi, George W.; and Kanyo, Kalman, 4,391,307, Cl. 140-140.000.

G. Siempelkamp GmbH & Co.: *See*—
Molina Bonillo, Juan J., 4,391,577, Cl. 425-338.000.

Gadelle, Claude: *See*—
Burger, Jacques; Bardon, Charles; and Gadelle, Claude, 4,391,555, Cl. 405-264.000.
Burger, Jacques; Bardon, Charles; and Gadelle, Claude, 4,391,556, Cl. 405-264.000.

Galland, Lesley A.; and Skiver, Bruce W., to J. R. Simplot Company. Rotary cutting machine. 4,391,172, Cl. 83-403.000.

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Garkusha, Anatoly V.; and Dobrynin, Vladimir E. Exhaust pipe of turbine. 4,391,564, Cl. 415-126.000.

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Gassner, Paul B. Combination pocket pad and writing instrument holder. 4,391,457, Cl. 281-31.000.

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Gauthier, Richard. Generator for underwater lighting systems. 4,392,071, Cl. 310-113.000.

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Bialous, Charles A.; Luce, John B.; and Mark, Victor, 4,391,935, Cl. 524-82.000.
Brown, Thomas A.; and Peil, William, 4,392,081, Cl. 315-46.000.
Cleveland William K. S.; Webb, Jimmy L.; and Orlando, Charles M., 4,391,996, Cl. 568-726.000.
Cooper, Glenn D., 4,391,950, Cl. 525-132.000.
Foley, James W. B.; and Osterhout, David J., 4,392,172, Cl. 361-8.000.
Frind, Gerhard; Carroll, James J.; and Van Noy, John H., 4,392,035, Cl. 200-144.00B.
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Grajewski, John P.; and Loyzim, Robert J., 4,392,096, Cl. 318-625.000.
Gulick, William K., 4,391,093, Cl. 60-39.290.
Houston, John M., 4,392,235, Cl. 378-10.000.
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Ishler, William E.; Weber, William B.; and Giudici, Livio L., 4,392,076, Cl. 313-318.000.
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Labbe, Donald E.; and Brown, Mayo E., Jr., 4,391,101, Cl. 60-646.000.
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Rosenberry, George M., 4,392,072, Cl. 310-216.000.
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Scott, Steven W., 4,391,954, Cl. 525-439.000.
Sugalski, Raymond K.; and Blake, Charles R., 4,392,102, Cl. 320-48.000.
Welles, Kenneth B., II, 4,392,068, Cl. 307-522.000.
Williams, Raymond L., 4,391,290, Cl. 137-81.100.
Zdaniewski, Joseph J., 4,392,070, Cl. 310-43.000.

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General Foods Corporation: *See*—
Spradlin, Joseph E.; Morgan, Jeffrey D.; Olson, Allan R.; and Howley, Joseph P., 4,391,829, Cl. 426-28.000.

General Foods Inc.: *See*—
Grealy, Jennifer M.; and Maurice, Terrence J., 4,391,750, Cl. 260-123.500.

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General Motors Corporation: *See*—
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General Signal Corporation: *See*—
Hershel, Ronald S., 4,391,494, Cl. 350-442.000.
Keenan, John R., 4,391,293, Cl. 137-312.000.

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Boverman, Bentsion; and Vodyanitsky, Vilen, 4,391,170, Cl. 83-71.000.
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Pugh, Robert J., 4,391,503, Cl. 355-3.0DD.

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Arsuaga, Yavier, 4,391,469, Cl. 299-11.000.
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Langenberg, Helmut; Grisebach, Hans-Theodor; and Weinhold, Heinz, 4,391,470, Cl. 299-11.000.
Weirich, Walter; Dettmers, Michael; Becker, Kunibert; and Rosenberg, Harry, 4,391,181, Cl. 91-29.000.
Weirich, Walter; and Heitkamp, Herbert, 4,391,553, Cl. 405-141.000.

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Gheewala, Tushar R.: *See*—
Chang, Wen H.; Gheewala, Tushar R.; and Harris, Erik P., 4,392,148, Cl. 357-5.000.

Ghiz, George J.: *See*—
Goettl, John M., 4,391,005, Cl. 4-490.000.

Giasini, Giovanni. Apparatus for joining thin metal strips end-to-end. 4,391,037, Cl. 29-716.000.

Gibas, Christoph; and Muller, Michael. Switching magnet. 4,392,117, Cl. 335-297.000.

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Gibson, Kirk R., to Chevron Research Company. Large pore shaped hydroprocessing catalysts. 4,391,740, Cl. 252-470.000.

Giers: *See*—
Janssen, Sylvain; and Sequies, Jean, 4,391,145, Cl. 73-704.000.

Giess, Hans J., to Fletcher Timber Limited. Method of constructing a building system. 4,391,077, Cl. 52-747.000.

Giggi, Robert A.: *See*—
Arulpragasam, Jega A.; Giggi, Robert A.; Lary, Richard F.; and Sullivan, Daniel T., 4,392,200, Cl. 364-200.000.

Gill, H. Ross, III, to National Latex Products Co., The. Balloon with sealing device therefor and method. 4,391,063, Cl. 46-90.000.

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Farmer, Robert F., III, 4,391,927, Cl. 523-161.000.

Gilliland, Malcolm T. Thyristor controlled welding power supply. 4,392,045, Cl. 219-130.100.

Gillone, Walter: *See*—
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Gilmore, Dennis W.: *See*—
Kugele, Thomas G.; and Gilmore, Dennis W., 4,391,757, Cl. 260-446.000.

Gilvin, Philip J.: *See*—
Mathieson, Ernest; Smith, Graham C.; and Gilvin, Philip J., 4,392,057, Cl. 250-385.000.

Girard, Alain: *See*—
Barkats, Gerard; Girard, Alain; Marchal, Jean; and Morel, Charles, 4,392,007, Cl. 136-248.000.
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Glascock, Homer H., II; Houston, Douglas E.; McLaughlin, Michael H.; and Webster, Harold F., to General Electric Company. Cooled semiconductor power module including structured strain buffers without dry interfaces. 4,392,153, Cl. 357-82.000.
Glaser, Dieter, to PEG Perego-Pines Deutschland GmbH. Child stroller. 4,391,453, Cl. 280-47.400.
Glasurit America, Inc.: *See*—
Batzill, Wolfgang, 4,391,858, Cl. 427-407.100.
Glenn, Raymond R.; and Bell, David, to Harris Corporation. Multiprocessor time alignment control system. 4,392,196, Cl. 364-200.000.
Godbey, John K.; and Ballard, B. G., to Mobil Oil Corporation. Automatic liquid level monitor. 4,391,135, Cl. 73-155.000.
Goddard, John, to Rolls-Royce Limited. Method of manufacture of an article having internal passages. 4,391,684, Cl. 204-129.400.
Goettl, John M., to Ghiz, George J. Apparatus for cleaning swimming pools. 4,391,005, Cl. 4-490.000.
Golden, Theodore A. Child-proof electrical plug sheath. 4,391,481, Cl. 339-42.000.
Goldhammer, Albert. Apparatus for limiting filling height of containers. 4,391,412, Cl. 241-36.000.
Golias, Tipton L., to Helena Laboratories Corporation. Automated electrophoresis and staining apparatus and method. 4,391,689, Cl. 204-180.00G.
Gollomp, Bernard P., to Bendix Corporation, The. Switching equipment for testing apparatus. 4,392,107, Cl. 324-73.00R.
Goodman, Faith L.: *See*—
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Uram, John R., Jr., 4,391,924, Cl. 521-178.000.
Goodyear Tire & Rubber Company, The: *See*—
Bell, Anthony J., 4,391,737, Cl. 252-429.00B.
D'Sidocky, Richard M., 4,392,004, Cl. 585-820.000.
Fishbaugh, Byron L., 4,391,436, Cl. 267-141.100.
Kneip, Fernand; and Marnach, Ernest, 4,392,176, Cl. 361-160.000.
Massey, Freddie L.; and Callander, Douglas D., 4,391,971, Cl. 528-481.000.
Maxey, Frank S., deceased; and Mowdood, Syed K., 4,391,318, Cl. 152-359.000.
McCarthy, Harold J., Jr., 4,391,868, Cl. 428-215.000.
Gordon, Alan J., to Shandon Southern Products Limited. Cytocentrifuge. 4,391,710, Cl. 210-361.000.
Gordon, Ellison T., to Zollco International, Inc. Floating, surface liquids retrieval system. 4,391,707, Cl. 210-242.300.
Gordon, Marvin: *See*—
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Gothberg, Owe. Support strip with U-shaped cross-section of plastic material for supporting conduits, cables and the like. 4,391,426, Cl. 248-49.000.
Gotou, Mikio: *See*—
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Gracia, Robert F.; and Fromson, Howard A., to Fromson, Howard A. Diazo lithographic printing plate developing process. 4,391,897, Cl. 430-302.000.
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Anderson, Susan; Brown, David E.; Graham, David E.; Mahmood, Mahmood N.; and Man, Maurice C. M., 4,391,681, Cl. 204-99.000.
Grajek, Stanley A.; Hill, Robert S.; and Klaiber, George S., to Wurlitzer Company, The. Piano soundboard and method of making same. 4,391,177, Cl. 84-196.000.
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Gray, Frederick M.; and Leedham, Charles G., to General Electric Company Limited, The. Receiver for A.C. electrical supply signalling arrangement. 4,392,121, Cl. 340-310.00A.
Grealy, Jennifer M.; and Maurice, Terrence J., to General Foods Inc. Heat gellable protein isolate. 4,391,750, Cl. 260-123.500.
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Secor, Arthur D.; and Secor, Jerome G., 4,391,451, Cl. 279-2.00A.
Green, Albert W.: *See*—
Perkins, Henry T.; Saunders, Kim D.; and Green, Albert W., 4,391,136, Cl. 73-189.000.
Green, Philip S., to SRI International. Ultrasonic transducer system and method. 4,391,281, Cl. 128-660.000.
Greenaway, Ivan R.: *See*—
Burrows, James E.; and Greenaway, Ivan R., 4,392,208, Cl. 364-900.000.
Greene, Richard A.; and Kennedy, Robert P., to Western Electric Company, Inc. Methods and apparatus for preparing the terminated end of flat cable for connectorization. 4,391,038, Cl. 29-829.000.
Greenlee, Donald R., to Dresser Industries, Inc. Stinger assembly for oil well tool. 4,391,326, Cl. 166-240.000.
Greier, Josef; and Pomfret, Colin T., to List, Hans. Air-cooled internal combustion engine. 4,391,238, Cl. 123-193.00C.
Greiff, Carl D.: *See*—
Prim, David F.; and Greiff, Carl D., 4,392,204, Cl. 364-478.000.
Greive, Aloys; Horstmann, Aloys; and Stupirak, Wilhelm, to Volkmann GmbH & Co. Twisting apparatus. 4,391,087, Cl. 57-58.520.
Grenier, Yves, to R.I.A.T. Appliance designed for the treatment, particularly in a liquid, of a product like leather and procedure for applying this appliance. 4,391,109, Cl. 69-30.000.
Grier, Nathaniel: *See*—
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Grimes, Fred K., to Lance Austin Enterprises, Inc. Lance-type fixture support and method of use. 4,391,428, Cl. 248-546.000.
Grindheim, Earl A., to Rosemount Inc. Parallel T impedance measurement circuit for use with variable impedance sensor. 4,391,146, Cl. 73-718.000.
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Gromek, Francis S.: *See*—
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Gronbech, Robert W., to Davy-Loewy Limited. Uncoiler for metallic strip material. 4,391,417, Cl. 242-78.600.
Grossmann, Karl; and Mullejans, Robert, to Friemann & Wolf GmbH. Explosion-proof and firedamp-proof headlight. 4,392,185, Cl. 362-105.000.
Groupement d'Interet Econoique de Recherche et de Developpement PSA: *See*—
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GTE Products Corporation: *See*—
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Knoll, William C.; and Bay, David L., 4,392,085, Cl. 315-173.000.
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GTE Sylvania Canada Limited: *See*—
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Guardsman Chemicals, Inc.: *See*—
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Gudnason, Geir V.; Crowe, Laurie M.; and Chang, Shin S., to Coca Cola Company. Production of liquid yogurt stabilized with high methoxyl pectin. 4,391,830, Cl. 426-43.000.
Gulf & Western Manufacturing Company: *See*—
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Guy, Burlin A., Jr. Snow blower. 4,391,052, Cl. 37-236.000.
Gwathney, Kenneth W.; Gann, David L.; Seagraves, Steven G., Sr.; Fenner, Gary R.; and Fenner, Gordon H., to Marathon Equipment Company. Pin-off and door closure assembly for a stationary refuse compactor. 4,391,188, Cl. 100-229.00A.
Haas, Franz, Jr.: *See*—
Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johaan, 4,391,832, Cl. 426-275.000.
Haas, Franz, Sr.; Haas, Franz, Jr.; and Haas, Johaan. Process for making multi-layer cream-filled wafer blocks. 4,391,832, Cl. 426-275.000.
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Saylor, Arthur D.; and Habegger, Henry L., 4,391,300, Cl. 138-99.000.

Haeger, Virgil J. Hardware press and punch apparatus. 4,391,358, Cl. 192-130.000.

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Haigh, Jeffrey G.; and Cheriton, Leslie W. Capsules containing self-setting compositions and the compositions. 4,391,931, Cl. 523-318.000.

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Hall, Gary Lester: *See*—
Hall, Lester B., 4,392,215, Cl. 367-139.000.

Hall, Lester B., to Hall, Gary Lester. Pest control apparatus. 4,392,215, Cl. 367-139.000.

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Hallford, Ben R., to Rockwell International Corporation. Symmetric microwave mixer with coplanar diode connection. 4,392,251, Cl. 455-327.000.

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Halliday, Jonathan, to Independent Broadcasting Authority. Surround sound system. 4,392,019, Cl. 179-1.0GQ.

Halstead, Raymond T.: *See*—
Schaad, William J.; Black, Charles E., III; and Halstead, Raymond T., 4,392,029, Cl. 200-5.00B.

Hamada, Hitosi: *See*—
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Hamada, Minoru: *See*—
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Hamburger, Manny C. Combined pattern holder and pattern position indicator. 4,391,591, Cl. 434-95.000.

Hamelin, Claude, to Institut Armand-Frappier. Electrophoresis system for multiple agarose slab gels. 4,391,688, Cl. 204-180.00G.

Hamilton, Floyd B.: *See*—
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Hannibal, Alan J.; and Parr, Charles H., to Lord Corporation. Flexible coupling. 4,391,594, Cl. 464-80.000.

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Hanson, Jay R.: *See*—
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Hara, Kiyoshi: *See*—
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Hara, Yoshiaki, to Kabushiki Kaisha Daini Seikosha. Electromagnetic acoustic transducer. 4,391,532, Cl. 368-250.000.

Harada, Koji, to Hitachi, Ltd. Pressure-sensitive ignition plug. 4,392,082, Cl. 315-55.000.

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Hardy, Nicolas; Lerot, Luc; and Walraevens, Rene, to Propylox. Process for the manufacture of carboxylic peracids. 4,391,753, Cl. 549-525.000.

Harle, Anton. Collecting vessel. 4,391,138, Cl. 73-223.000.

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Harrell, Jerald R., to Du Pont de Nemours, E. I., and Company. Blowing agents as curatives for ethylene/carbon monoxide copolymers. 4,391,922, Cl. 521-88.000.

Harris Corporation: *See*—
Glenn, Raymond R.; and Bell, David, 4,392,196, Cl. 364-200.000.

Harris, Erik P.: *See*—
Chang, Wen H.; Gheewala, Tushar R.; and Harris, Erik P., 4,392,148, Cl. 357-5.000.

Harris, John F., Jr., to Du Pont de Nemours, E. I., and Company. Polymers from phenylterephthalic acid. 4,391,966, Cl. 528-176.000.

Harris, Norman; Flintoff, John F.; and Kippax, John W., to Davy McKee (Oil & Chemicals) Limited. Process for producing substantially sulphur-free butene-1. 4,391,677, Cl. 203-28.000.

Harris, Robert H.; Humphrey, Troy G.; and Stimson, John J., Jr., to Labeco Harvesters, Inc. Grape harvester. 4,391,085, Cl. 56-330.000.

Harris, Thomas G., to Armstrong World Industries, Inc. Useful solutions of the tetramethylol derivative of 4,4'iso-propylidenediphenol. 4,391,929, Cl. 523-218.000.

Harrison, Boyd L.; and Doherty, Niall S., to Merrell Dow Pharmaceuticals Inc. 4-(Substituted alkyl)-N-(1,3-dithiolan-2-ylidene(aniline. 4,391,818, Cl. 424-277.000.

Harrison, David E., to Beatrice Foods Co. Soft toilet seat and hinge connector. 4,391,001, Cl. 4-236.000.

Harrison, Kenneth J.; Raynes, Edward P.; Saunders, Frances C.; and Thompson, David J., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Liquid crystal materials containing pleochroic anthraquinone dyes. 4,391,489, Cl. 350-349.000.

Hartai, Julius. Device for charging a charging capacitor. 4,392,088, Cl. 315-241.00R.

Hartemann, Pierre: *See*—
Volluet, Gerard; and Hartemann, Pierre, 4,392,115, Cl. 333-141.000.

Hartford Fibres, Ltd.: *See*—
Laird, William F.; and Wood, Kenneth A., 4,391,169, Cl. 83-37.000.

Hartke, David H., to Xerox Corporation. Interface for proximity coupled electro-optic devices. 4,391,490, Cl. 350-356.000.

Haruta, Masahiro: *See*—
Inoue, Eiichi; Takatori, Yasushi; and Haruta, Masahiro, 4,392,141, Cl. 346-1.100.

Harwath, Frank L.: *See*—
Hunsberger, Dale L.; and Harwath, Frank L., 4,391,580, Cl. 431-1.000.

Hasegawa, Morihiro: *See*—
Yamauchi, Takashi; Maruhashi, Shigeaki; and Hasegawa, Morihiro, 4,391,633, Cl. 75-53.000.

Hasegawa, Satoshi: *See*—
Hirosaki, Botaro; and Hasegawa, Satoshi, 4,392,220, Cl. 370-18.000.

Hashimoto, Wataru: *See*—
Shinoi, Tsuyoshi; Mochizuki, Keisuke; Suzuki, Yoshimi; Kudoh, Masaru; and Hashimoto, Wataru, 4,392,024, Cl. 179-99.00R.

Haskins, Glenn M.: *See*—
Rand, Robert W.; Snow, Harold D.; Elliott, David G.; and Haskins, Glenn M., 4,392,040, Cl. 219-10.710.

Hata, Yoshitaka: *See*—
Shioyama, Giichi; Hata, Yoshitaka; and Nakajima, Masao, 4,391,247, Cl. 123-403.000.

Hauschopp, Alois; Schneider, Hans-Dieter; and Rassmann, Christoph, to Gewerkschaft Eisenhutte Westfalia. Guides for mineral mining machines. 4,391,471, Cl. 299-43.000.

Hawkins, Brian M.: *See*—
Schild, Rolf; Melrose, Denis G.; and Hawkins, Brian M., 4,391,009, Cl. 5-453.000.

Hawkins, William E., to Du Pont de Nemours, E. I., and Company. Proximity sensor. 4,391,127, Cl. 73-37.700.

Hayano, Fusakazu: *See*—
Yoshida, Koichi; and Hayano, Fusakazu, 4,391,912, Cl. 435-241.000.

Hayata, Naohiro: *See*—
Inamoto, Jiro; and Hayata, Naohiro, 4,391,314, Cl. 152-210.000.

Haynes, Joseph M.: *See*—
Cronan, John M.; Haynes, Joseph M.; and Jones, Darrell D., 4,391,347, Cl. 182-113.000.

Hayssen Manufacturing Company: *See*—
Chermey, Dale M., 4,391,079, Cl. 53-396.000.
Kovacs, Lloyd, 4,391,081, Cl. 53-436.000.

Hearold, Owen E.; and Bennett, Harvey G. Illuminating method and apparatus for carpenter's or mechanic's levels. 4,392,184, Cl. 362-101.000.

Heaslip, Lawrence J.; Hohulin, Alphia L.; and Mitchell, Joseph R., to Keystone Consolidated Industries, Inc. Apparatus for introducing elements into molten metal streams and casting in inert atmosphere. 4,391,319, Cl. 164-259.000.

Hederich, Volker: *See*—
Kruckenberg, Winfried; Schundehutte, Karl H.; and Hederich, Volker, 4,391,606, Cl. 8-525.000.

Hedrich, Wilhelm; Krumm, Heinz; and Haeuser, Erhard, to Wilhelm Hedrich Vakuumanlagen GmbH & Co. KG. Apparatus for mixing and degassing components of synthetic resins, particularly thermosetting synthetic resins. 4,391,529, Cl. 366-266.000.

Heffington, Charles A., Jr. Patient support attachment for surgical tables. 4,391,438, Cl. 269-328.000.

Heitkamp, Herbert: *See*—
Weirich, Walter; and Heitkamp, Herbert, 4,391,553, Cl. 405-141.000.

Heja, Gergely: *See*—
Korbonits, Dezso; Nogradi, Mihaly; Vermes nee Szluha, Borbala; Strelisky, Janos; Wolfner, Andras; Heja, Gergely; Kovacz, Gabor; Szegi, Jozsef; and Virag, Sandor, 4,391,821, Cl. 424-283.000.

Helena Laboratories Corporation: *See*—
Golias, Tipton L., 4,391,689, Cl. 204-180.00G.

Helene Curtis Industries: *See*—
Hsiung, Da Y.; Davis, Chester A.; and Nicholson, Harold J., 4,391,286, Cl. 132-7.000.

Helgeson, Norman L.: *See*—
Studhalter, Walter R.; Amend, William E.; and Helgeson, Norman L., 4,391,102, Cl. 60-649.000.

Hendriks, Dieter, to Sublistatic Holding, S.A. Magnetic developers and process for their preparation. 4,391,893, Cl. 430-137.000.

Henke, Ronald E.: *See*—
Arends, Albert W.; and Henke, Ronald E., 4,391,768, Cl. 264-285.000.

Henkel Corporation: *See*—
Lundmark, Larry D., 4,391,732, Cl. 252-356.000.

Hennequin, Jean-Claude, to Essilor International. Process and device for the positioning of an optical measuring instrument and a spectacle frame in relation to each other. 4,391,527, Cl. 356-375.000.

Henry, Paul S., to Bell Telephone Laboratories, Incorporated. Spread spectrum FH-MFSK decoder. 4,392,231, Cl. 375-80.000.

Hepar Industries: *See*—
Fussi, Fernando F., 4,391,803, Cl. 424-239.000.

Herman, Daniel F.; and Kruse, Uno, to NL Industries, Inc. Opacifying polymeric particle and uses. 4,391,928, Cl. 523-201.000.

Herman, Shmuel Y. Writing parchment and methods for the production thereof. 4,391,601, Cl. 8-94.150.

Hermann, Conrad, 3rd. Method of playing a two-player board game. 4,391,448, Cl. 273-243.000.

Hermann Wiederhold G.m.b.H. Corp.: *See*—
Falkenburg, Hans R.; Krause, Siegfried; and McGuiness, Robert C., 4,391,965, Cl. 528-112.000.

Herrington, Daniel R.: *See*—
Kuch, Philip L.; Herrington, Daniel R.; and Eggett, Janet M., 4,391,756, Cl. 260-430.000.

Hershel, Ronald S., to General Signal Corporation. Apparatus for projecting a series of images onto dies of a semiconductor wafer. 4,391,494, Cl. 350-442.000.

Herzl, Peter J., to Fischer & Porter Company. Doppler-type ultrasonic flowmeter. 4,391,149, Cl. 73-861.250.

Hesketh, Truman H., to Plessey Overseas Limited. Time division multiplex module for use in digital switching network. 4,392,221, Cl. 370-54.000.

Hetzner, Randall H. Adjustable trailer drawbar. 4,391,562, Cl. 414-483.000.

Heye, Hermann: *See*—
Geisel, Gerhard, 4,391,620, Cl. 65-26.000.
Schaar, Lothar, 4,391,578, Cl. 425-525.000.

Heyman, Joseph S.: *See*—
Cantrell, John H., Jr.; and Heyman, Joseph S., 4,391,142, Cl. 73-610.000.

Hibino, Yutaka: *See*—
Horikawa, Takahiro; Hibino, Yutaka; and Maki, Seiichi, 4,391,218, Cl. 118-621.000.

Hickam, William M.: *See*—
Lin, Ching-Yu; and Hickam, William M., 4,391,690, Cl. 204-412.000.

Higuchi, Mitsuo: *See*—
Miyasaka, Kiyoshi; and Higuchi, Mitsuo, 4,392,212, Cl. 365-230.000.

Hildebrand, Dietrich, to Bayer Aktiengesellschaft. Dyeing process and printing process using reactive dyestuffs. 4,391,607, Cl. 8-549.000.

Hildebrand, Karl J.; and Leeman, John, to Leeman Labs Inc. Scannable detector system for echelle grating spectrometers. 4,391,523, Cl. 356-328.000.

Hilfiker, Harold O., deceased: *See*—
Hilfiker, William K.; Hilfiker, Harold O., deceased; and Hilfiker, William B., 4,391,557, Cl. 405-287.000.

Hilfiker, Louise E., executor: *See*—
Hilfiker, William K.; Hilfiker, Harold O., deceased; and Hilfiker, William B., 4,391,557, Cl. 405-287.000.

Hilfiker Pipe Co.: *See*—
Hilfiker, William K.; Hilfiker, Harold O., deceased; and Hilfiker, William B., 4,391,557, Cl. 405-287.000.

Hilfiker, William B.: *See*—
Hilfiker, William K.; Hilfiker, Harold O., deceased; and Hilfiker, William B., 4,391,557, Cl. 405-287.000.

Hilfiker, William K.; Hilfiker, Harold O., deceased (by Hilfiker, Louise E., executor); and Hilfiker, William B., to Hilfiker Pipe Co. Retaining wall for earthen formations and method of making the same. 4,391,557, Cl. 405-287.000.

Hilker, George D., to Phelps Dodge Industries, Inc. Method for manufacturing magnet wire. 4,391,848, Cl. 427-118.000.

Hill, Charles D. B.: *See*—
Hill, Richard N., Sr.; and Hill, Charles D. B., 4,391,784, Cl. 423-320.000.

Hill, Gilman A.: *See*—
Ford, Franklin C.; Hill, Gilman A.; and Vincent, Coye T., 4,391,337, Cl. 175-4.600.

Hill, Richard N., Sr.; and Hill, Charles D. B. Foam control during production of phosphoric acid. 4,391,784, Cl. 423-320.000.

Hill, Robert S.: *See*—
Grajek, Stanley A.; Hill, Robert S.; and Khalber, George S., 4,391,177, Cl. 84-196.000.

Hiiti Aktiengesellschaft: *See*—
Mauthe, Peter, 4,391,662, Cl. 156-64.000.

Hinz, Claus-Dieter; and Pasternack, Adalbert, to Dragerwerk Aktiengesellschaft. Heat protection garment. 4,390,997, Cl. 2-81.000.

Hinz, Hans D.; and Lobl, Herbert, to U.S. Philips Corporation. Circuit arrangement for controlling a large number of printing electrodes for non-mechanical printing. 4,392,194, Cl. 346-154.000.

Hiraishi, Hisashi: *See*—
Murakami, Shinichi; Morichika, Toshiaki; Hiraishi, Hisashi; and Shiokawa, Hiroyuki, 4,391,635, Cl. 75-125.000.

Hirano, Yutaka, to Fujitsu Limited. Semiconductor device. 4,392,152, Cl. 357-80.000.

Hirao, Hiroshi, to Fujitsu Limited. Schmidt trigger circuit. 4,392,066, Cl. 307-290.000.

Hirasawa, Yoshihei: *See*—
Suda, Tatsuo; Hirasawa, Yoshihei; Takahashi, Sachio; Abe, Etsuko; Konno, Kunio; and Aoki, Tadao, 4,391,802, Cl. 424-236.000.

Hirashima, Kenzo: *See*—
Takemura, Toji; and Hirashima, Kenzo, 4,391,356, Cl. 192-84.00C.

Hirata, Isao, to Tokai Metals Company Limited. Foldable cup. 4,391,366, Cl. 206-218.000.

Hirosaki, Botaro; and Hasegawa, Satoshi, to Nippon Electric Co., Ltd. Modem to be coupled to a directional transmission line of an SS multiplex communication network. 4,392,220, Cl. 370-18.000.

Hirose, Takao: *See*—
Uemura, Seiichi; Yamamoto, Shunichi; Hirose, Takao; Takashima, Hiroaki; and Kato, Osamu, 4,391,788, Cl. 423-447.600.

Hitachi, Ltd.: *See*—
Akiyama, Nobuyuki; Kembo, Yukio; Nakagawa, Yasuo; Aiuchi, Susumu; and Nomoto, Mineo, 4,391,511, Cl. 355-40.000.
Aoki, Masakazu; Ando, Haruhisa; Ohba, Shinya; Hanamura, Shoji; Takemoto, Iwao; and Izawa, Ryuichi, 4,392,158, Cl. 358-213.000.
Harada, Koji, 4,392,082, Cl. 315-55.000.
Iso, Yoshimi; Inoue, Shigeki; and Shibuya, Toshifumi, 4,392,020, Cl. 179-1.0GE.
Kojima, Takafumi; Tamaki, Kenzo; and Yokota, Shiro, 4,392,026, Cl. 179-175.30R.
Kuwabara, Kouji; Sugawara, Hiroyuki; Shirakura, Toshiharu; Sasaki, Kouji; and Takemori, Satoshi, 4,391,519, Cl. 356-153.000.
Matsuura, Shigeo; and Yuki, Ikuo, 4,392,249, Cl. 455-164.000.
Suzuki, Masayoshi; and Sagawa, Akio, 4,392,069, Cl. 307-252.00A.
Tomita, Yoshifumi; and Nakai, Hiromitsu, 4,391,885, Cl. 430-28.000.
Yokozawa, Norio; Takasugi, Wasao; Yonezawa, Seiji; and Ueyanagi, Kiichi, 4,392,219, Cl. 369-44.000.

Hitachi Maxell, Ltd.: *See*—
Okada, Shuhei, 4,392,170, Cl. 360-133.000.
Yamakawa, Tohru; and Akiyama, Kozi, 4,391,669, Cl. 156-539.000.

Hobourn-Eaton Limited: *See*—
Bristow, Ian T.; and Thornelow, Alec, 4,391,569, Cl. 417-302.000.

Hocken, Redvers A. Magnetically triggered on-board elapsed time indicator. 4,392,122, Cl. 340-323.00R.

Hodogaya Chemical Co., Ltd.: *See*—
Takematsu, Tetsuo; Isogawa, Takayuki; and Sakuraba, Yasuya, 4,391,631, Cl. 71-118.000.

Hoechst Aktiengesellschaft: *See*—
Becker, Wilhelm, 4,391,957, Cl. 525-454.000.
Blume, Ernst; Schaper, Wolfgang; Raether, Wolfgang; and Dittmar, Walter, 4,391,805, Cl. 424-246.000.
Eckardt, Peter; and Voetz, Franz J., 4,391,644, Cl. 106-85.000.
Haas, Hans; and Kowalski, Werner, 4,391,783, Cl. 423-315.000.
Kaiser, Karl; and Oborodnik, Alexander, 4,391,972, Cl. 528-499.000.
Kersting, Hans-Joachim; Wolfrum, Erhard; Portz, Willi; and Strauss, Georg, 4,391,786, Cl. 423-442.000.
Kuhls, Jurgen; Mayer, Franz; and Fitz, Herbert, 4,391,940, Cl. 524-458.000.
Mehdorn, Frank R.; and Seelig, Johann, 4,391,025, Cl. 28-289.000.
Nahm, Helmut; and Granzer, Ernold, 4,391,995, Cl. 568-637.000.
Preisler, Eberhard; Hofmann, Bernhard; and Holzem, Johannes, 4,391,714, Cl. 210-670.000.

Hoechst, Lonnie D.: *See*—
Weber, Henry J.; Hoechst, Lonnie D.; Christensen, James R.; and Watts, Verne C., 4,391,344, Cl. 180-271.000.

Hoefelmayr, Tilman; and Maier, Jakob, to Biomelktechnik Hoefelmayr & Co. Method for mechanical milk removal. 4,391,221, Cl. 119-14.080.

Hoegerle, Karl; Gsell, Laurenz; and Wehrli, Rudolf, to Ciba-Geigy Corporation. 2-Methyl-4-N,N-dimethylcarbamoyloxy-6-aminopyrimidines and salts thereof, processes for producing them, and their use for combating pests. 4,391,810, Cl. 424-251.000.

Hoer, Ralph A.: *See*—
Ederle, John A.; Hoer, Ralph A.; and Irwin, George H., 4,391,840, Cl. 426-641.000.

Hoffman, Lester J.: *See*—
Roberts, Richard D.; and Hoffman, Lester J., 4,392,091, Cl. 318-52.000.

Hoffmann-La Roche Inc.: *See*—
Boller, Arthur; Schadt, Martin; and Villiger, Alois, 4,391,731, Cl. 252-299.620.
Imhof, Rene; and Kyburz, Emilio, 4,391,978, Cl. 546-138.000.

Hoffmann, Rolf, to van Laack, Schmitz & Eltschig GmbH u. Co. Method for laying shirts, especially men's shirts, for purposes of wrapping. 4,391,394, Cl. 223-37.000.

Hofmann, Bernhard: *See*—
Preisler, Eberhard; Hofmann, Bernhard; and Holzem, Johannes, 4,391,714, Cl. 210-670.000.

Hohulin, Alphia L.: *See*—
Heaslip, Lawrence J.; Hohulin, Alphia L.; and Mitchell, Joseph R., 4,391,319, Cl. 164-259.000.

Hokko Chemical Industry Company, Ltd.: *See*—
Ohyama, Hiroshi; Morita, Ken; Wada, Takuo; and Miyahara, Masahiko, 4,391,804, Cl. 424-245.000.

Holan, George; and Walser, Reimund, to Commonwealth Scientific and Industrial Research Organization. Insecticidal ester enantiomers. 4,391,820, Cl. 424-282.000.

Holgersson, Stig L., to Telefonaktiebolaget L M Ericsson. Band-shaped device for forming a pipe-shaped protection cover. 4,391,303, Cl. 138-166.000.

Holl, Helmar; and Kessler, Rolf, to Dorina Nahmaschinen GmbH. Method and device for forming an overcast seam by means of a zigzag sewing machine. 4,391,214, Cl. 112-269.100.

Holland, Gwendolyn B.; and Holland, John W. Cardboard house for pets. 4,391,223, Cl. 119-19.000.

Holland, John W.: *See*—
Holland, Gwendolyn B.; and Holland, John W., 4,391,223, Cl. 119-19.000.

Hollier, Joseph H., Jr., to Sutco, Inc. Facilitating the exchange of a finished package with a new core. 4,391,415, Cl. 242-56.900.

Hollowell, William: *See*—
Ahad, Munir J.; Hollowell, William; Tanaka, Akira; and Ziv, Avraham, 4,391,420, Cl. 242-107.40A.

Holmes, Allen B., to United States of America, Army. Electro fluidic actuator. 4,391,299, Cl. 137-831.000.

Holsman, Henrietta H. Weep screed. 4,391,074, Cl. 52-367.000.

Holthoff, Helmut: *See*—
Bindernagel, Ali; Holthoff, Helmut; and Diel, Hartmut, 4,391,357, Cl. 192-94.000.

Holzem, Johannes: *See*—
Preisler, Eberhard; Hofmann, Bernhard; and Holzem, Johannes, 4,391,714, Cl. 210-670.000.

Holzleitner, Johann, to Bombardier-Rotax G.m.b.H. Internal combustion engine comprising means for controlling the axial extent of a port in a cylinder. 4,391,234, Cl. 123-65.00V.

Honda Giken Kogyo Kabushiki Kaisha: *See*—
Ban, Keisuke; and Arai, Takeo, 4,391,161, Cl. 74-579.00E.
Kawabata, Etsuo; Ogura, Masahiko; Takagi, Akinobu; and Fujimura, Akira, 4,391,246, Cl. 123-391.000.
Nishikawa, Masao; Toshimitsu, Yoshihiko; Aoyama, Toshihiko; Takaoka, Tokuro; Aoki, Takashi; and Sato, Yoichi, 4,391,342, Cl. 180-143.000.
Ohmori, Taiji, 4,391,452, Cl. 280-6.100.

Honeywell Inc.: *See*—
Stiglich, Ralph E., 4,392,065, Cl. 307-247.00A.
Zansky, Zoltan, 4,392,087, Cl. 315-219.000.

Honeywell Information Systems Inc.: *See*—
Brown, Richard P.; Barlow, George J.; and Peters, Arthur, 4,392,201, Cl. 364-200.000.

Honjo, Shigeru: *See*—
Kitane, Syoiti; Honjo, Shigeru; Ohe, Kuniyoshi; and Tobioka, Fumio, 4,391,658, Cl. 148-188.000.

Honnorat, Yves: *See*—
Bonnor, Yannick; Raisson, Gerard; and Honnorat, Yves, 4,391,772, Cl. 419-23.000.

Hook, Richard J.; and Rule, Mark, to Eastman Kodak Company. Process for the separation of isophthalic acid from terephthalic acid. 4,391,985, Cl. 562-414.000.

Hoose, Demetrius H. Rail car coupler interlock. 4,391,380, Cl. 213-76.000.

Hopfer, Samuel, to General Microwave Corporation. Broadband radiation detector for microwave and lower frequencies. 4,392,108, Cl. 324-95.000.

Hori, Hisako; Kitamura, Nobu; Shirahata, Isao; and Nakamura, Nobuyuki, to Furukawa Electric Co., Ltd., The. Process for cross-linking polycarbonate resins. 4,391,955, Cl. 525-462.000.

Horie, Yoshio: *See*—
Maeda, Umio; Shoji, Hirofumi; Wada, Yasusuke; and Horie, Yoshio, 4,391,743, Cl. 252-518.000.

Horii, Kenju, to Matsushita Electronics Corp. Solid-state color image sensor. 4,392,154, Cl. 358-44.000.

Horikawa, Takahiro; Hibino, Yutaka; and Maki, Seiichi, to Sumitomo Electric Industries, Ltd. Method and apparatus for forming corrosion-resistant layer and surface electrically conductive layer on cable and apparatus for practicing same. 4,391,218, Cl. 118-621.000.

Horng, Cheng T.; Schwenker, Robert O.; and Tsang, Paul J., to International Business Machines Corporation. Bipolar transistor. 4,392,149, Cl. 357-49.000.

Hornung, Friedrich: *See*—
Paule, Kurt; Schadlich, Fritz; Gerschner, Martin; and Hornung, Friedrich, 4,392,093, Cl. 318-245.000.

Horstmann, Aloys: *See*—
Greive, Aloys; Horstmann, Aloys; and Stupirak, Wilhelm, 4,391,087, Cl. 57-58.520.

Horvat, Marian L. Breast support. 4,391,277, Cl. 128-492.000.

Hosaka, Akihiko; Okuyama, Kiyotaka; and Isobe, Yukihiro, to TDK Electronics Co., Ltd. Magnetic recording medium. 4,391,864, Cl. 428-64.000.

Hosiden Electronics Co., Ltd.: *See*—
Tamamura, Junichi; Yasuda, Mamoru; Hosoda, Motomi; and Saeki, Shinichi, 4,392,025, Cl. 179-111.00R.

Hosoda, Motomi: *See*—
Tamamura, Junichi; Yasuda, Mamoru; Hosoda, Motomi; and Saeki, Shinichi, 4,392,025, Cl. 179-111.00R.

Hosposable Products Inc.: *See*—
Kronman, Albert F., 4,391,010, Cl. 5-484.000.

Hostetler, James W., to Litton Systems, Inc. Ring laser with plasma starter. 4,392,229, Cl. 372-94.000.

Hough, Harold L.; and Blaisdell, Ronald G., to GTE Products Corporation. Front loading projection unit with threaded resilient retention member. 4,392,189, Cl. 362-306.000.

Houston, Douglas E.: *See*—
Glascock, Homer H., II; Houston, Douglas E.; McLaughlin, Michael H.; and Webster, Harold F., 4,392,153, Cl. 357-82.000.

Houston, Herbert J.: *See*—
Nigol, Olaf; and Houston, Herbert J., 4,391,125, Cl. 73-11.000.

Houston, John M., to General Electric Company. Electronically scanned x-ray tomography system. 4,392,235, Cl. 378-10.000.

Houston, John M., to General Electric Company. Scanning x-ray inspection system. 4,392,237, Cl. 378-51.000.

Howard, Arthur G. Chemical-mixing and dispensing apparatus. 4,391,390, Cl. 222-136.000.

Howard, Dennis D.: *See*—
Miller, Henry C.; and Howard, Dennis D., 4,391,686, Cl. 204-159.150.

Howell, Peter A., to Minnesota Mining and Manufacturing Company. Glass bubbles of increased collapse strength. 4,391,646, Cl. 106-97.000.

Howley, Joseph P.: *See*—
Spradlin, Joseph E.; Morgan, Jeffrey D.; Olson, Allan R.; and Howley, Joseph P., 4,391,829, Cl. 426-28.000.

Hoya Corporation: *See*—
Nakagawa, Kenji; and Masuda, Isao, 4,391,916, Cl. 501-62.000.

Hozumi, Toshiaki: *See*—
Ishizaka, Sunao; and Hozumi, Toshiaki, 4,391,488, Cl. 350-257.000.

Hsiao, James C., to Union Special Corporation. Feed mechanism for sewing machines. 4,391,216, Cl. 112-316.000.

Hsiung, Du Y.; Davis, Chester A.; and Nicholson, Harold J., to Helene Curtis Industries. Hair conditioning and composition therefor. 4,391,286, Cl. 132-7.000.

Hsu, Yun-Tung, to Chiu, Pei-Liang. Gravity return hinge having an axle rod in an axle sleeve. 4,391,020, Cl. 16-314.000.

Huber, Calvin O.; Schick, Karl G.; and Coburn, Joel T., to Wisconsin Alumni Research Foundation; and Electric Power Research Institute, Inc. Method of and system for determining particular species of chlorine in a water sample. 4,391,775, Cl. 422-68.000.

Huggins, Raymond W., to Xerox Corporation. Method of development. 4,391,842, Cl. 427-14.100.

Hughes, Vincent L.: *See*—
Small, Augustus B.; Hughes, Vincent L.; and Benitez, Francisco M., 4,391,961, Cl. 526-76.000.

Huhn, Helmut; and Kaiser, Siegfried, to Wolff Walsrode Aktiengesellschaft. Coupled tubular casing for foodstuffs. 4,391,302, Cl. 138-118.100.

Hukuda, Masazi: *See*—
Ueno, Kunihiko; Ishii, Akiyasu; Hukuda, Masazi; and Nakayama, Kazuyuki, 4,391,763, Cl. 264-15.000.

Hum, Albert: *See*—
Neathway, Graham; Cramp, Allan; and Hum, Albert, 4,392,206, Cl. 364-900.000.

Humber, Leslie G.: *See*—
Bellini, Francesco; Sestanj, Kazimir; and Humber, Leslie G., 4,391,825, Cl. 424-319.000.

Hume, Ronald W. Apparatus for reconstituting a concentrate. 4,391,291, Cl. 137-99.000.

Humphrey, Troy G.: *See*—
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Hundertmark, James M., to Brunswick Corporation. Hydraulic trim-tilt system. 4,391,592, Cl. 440-61.000.

Hungerford, Gordon P., to Mobil Oil Corporation. Polymer film treatment with organic impregnant. 4,391,939, Cl. 524-377.000.

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Kelly, Thomas J.; and Robinson, Mark L., 4,391,634, Cl. 75-124.000.

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Schild, Rolf; Melrose, Denis G.; and Hawkins, Brian M., 4,391,009, Cl. 5-453.000.

Hurst, Dennis P., to United States of America, Navy. Digital interface system. 4,392,241, Cl. 455-26.000.

Hutson, Donald G., to Cal Detect, Inc. Apparatus for measuring breath alcohol. 4,391,777, Cl. 422-84.000.

Hutter, Charles G., III. Method of curing adhesive. 4,391,663, Cl. 156-64.000.

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Hydronautics, Incorporated: *See—*
Johnson, Virgil E., Jr.; Sundaram, T. R.; and Coss, Andrew F., 4,391,339, Cl. 175-393.000.
Ibau Hamburg Ingenieurgesellschaft Endustreibau mbH: *See—*
Klein-Albenhausen, Heinrich, 4,391,528, Cl. 366-15.000.
Ichikawa, Katsumi; Amano, Itaru; Ozaki, Keiji; and Suzuki, Seiichi, to Bridgestone Tire Co., Ltd.; and Kabushiki Kaisha Kobe Seiko Sho. Apparatus for loading unvulcanized tires on tire vulcanizing machine. 4,391,769, Cl. 264-326.000.
Ichiyanagi, Takashi: *See—*
Maruyama, Teruo; Ichiyanagi, Takashi; and Otoda, Ichizo, 4,392,168, Cl. 360-129.000.
Icking, Friedrich; and Stolte, Friedrich, to Westfalia Separator AG. Milk meter for measuring the total amount of milk from a cow in the course of a milking. 4,391,222, Cl. 119-14.170.
Ide, Katsuyuki; Ohe, Kempo; and Kobayashi, Hisao, to Toshiba Electric Equipment Corporation. Apparatus for operating a gaseous discharge lamp. 4,392,086, Cl. 315-174.000.
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Kishimoto, Kenjiro; Igarashi, Hideaki; and Kono, Migaki, 4,391,036, Cl. 29-623.200.
Iizuka, Haruhiko: *See—*
Sugasawa, Fukashi; and Iizuka, Haruhiko, 4,391,240, Cl. 123-198.00F.
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Peterson, Francis C., 4,392,033, Cl. 200-80.00R.
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Imai, Toshihiro; and Yamada, Toyotaka, to Olympus Optical Co., Ltd. Photometer having asymmetrical aperture and with compensation for direction of incidence. 4,391,521, Cl. 356-225.000.
Imamura, Yoshio, to Toyo Boseki Kabushiki Kaisha. Method of dehumidification. 4,391,616, Cl. 55-35.000.
IMED Corporation: *See—*
Jenkins, Jon A., 4,391,599, Cl. 604-118.000.
Imhof, Rene; and Kyburz, Emilio, to Hoffmann-La Roche Inc. Phenylquinolizidines. 4,391,978, Cl. 546-138.000.
Immel, Wolfgang: *See—*
Fauth, Karl-Heinz; Mohr, Heinrich; and Immel, Wolfgang, 4,391,959, Cl. 526-70.000.
Imperial Chemical Industries PLC: *See—*
Barham, Peter J.; and Selwood, Alan, 4,391,766, Cl. 264-210.100.
Falkenburg, Hans R.; Krause, Siegfried; and McGuiness, Robert C., 4,391,965, Cl. 528-112.000.
Leigh, Thomas, 4,391,983, Cl. 560-124.000.
Martin, Graham E., 4,391,770, Cl. 264-236.000.
Pears, Gordon E. A., 4,391,767, Cl. 264-210.300.
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Indak Manufacturing Corp.: *See—*
Schaad, William J.; Black, Charles E., III; and Halstead, Raymond T., 4,392,029, Cl. 200-5.00B.
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Halliday, Jonathan, 4,392,019, Cl. 179-1.0GQ.
Industrial Dynamics Company, Ltd.: *See—*
Calhoun, Fredrick L., 4,391,372, Cl. 209-523.000.
Industrial Filter & Pump Mfg. Co.: *See—*
Schmidt, Henry, Jr., 4,391,709, Cl. 210-332.000.
Ing. C. Olivetti & C., S.p.A.: *See—*
Bovio, Michele; Berruti, Pierangelo; and Gillone, Walter, 4,392,146, Cl. 346-140.00R.
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Reph, Arthur C., 4,391,475, Cl. 384-226.000.
Wilson, Joseph G., 4,391,613, Cl. 55-1.000.
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Inoue-Japax Research Incorporated: *See—*
Inoue, Kiyoshi, 4,392,042, Cl. 219-69.00W.
Inoue, Kiyoshi, 4,392,043, Cl. 219-69.00P.
Inoue, Kiyoshi, 4,392,195, Cl. 364-167.000.
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Inoue, Shigeki: *See—*
Iso, Yoshimi; Inoue, Shigeki; and Shibuya, Toshifumi, 4,392,020, Cl. 179-1.0GE.
Inoue, Yozo; Ito, Yoji; Hara, Kiyoshi; Usami, Kiyoshi; and Iwata, Yasuhiro, to Nippondenso Co., Ltd. Method and an apparatus for air conditioning for vehicles by controlling circulation of inside air and introduction of outside air. 4,391,320, Cl. 165-2.000.
Institut Armand-Frappier: *See—*
Hamelin, Claude, 4,391,688, Cl. 204-180.00G.
Institut Francais du Petrole: *See—*
Billon, Alain; Le Page, Jean-Francois; Peries, Jean-Pierre; and Simandoux, Jean-Claude, 4,391,700, Cl. 208-86.000.
Burger, Jacques; Bardon, Charles; and Gadelle, Claude, 4,391,555, Cl. 405-264.000.
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Cosyns, Jean; Juguin, Bernard; Le Page, Jean-Francois; and Miquel, Jean, 4,392,002, Cl. 585-329.000.
Le Page, Jean-Francois; and Martino, Germain, 4,391,701, Cl. 208-370.000.
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Wyszkowski, Jerzy; Panasiuk, Wladyslaw; Koprek, Stanislaw; and Piechal, Andzei, 4,391,654, Cl. 148-16.600.
Interatom, Internationale Atomreaktorbau GmbH: *See—*
Boese, Friedrich-Karl, 4,391,793, Cl. 423-648.00R.
Intermec Corporation: *See—*
Palmer, Roger C., 4,391,535, Cl. 400-120.000.
International Business Machines Corporation: *See—*
Bahr, Dietrich J.; and Briska, Marian, 4,392,143, Cl. 346-135.100.
Chang, Wen H.; Gheewala, Tushar R.; and Harris, Erik P., 4,392,148, Cl. 357-5.000.
DeBar, David E., 4,392,209, Cl. 365-110.000.
Horng, Cheng T.; Schwenker, Robert O.; and Tsang, Paul J., 4,392,149, Cl. 357-49.000.
Landrock, Jurgen B.; Penske, Manfred; and Tandjung, Halim S., 4,392,097, Cl. 318-696.000.
McLeod, Mark H., 4,392,105, Cl. 324-57.0DE.
Stuby, Kenneth P., 4,391,034, Cl. 29-579.000.
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Burrows, James E.; and Greenaway, Ivan R., 4,392,208, Cl. 364-900.000.
International Flavors & Fragrances Inc.: *See—*
Belko, Robert P.; Boden, Richard M.; and Hanna, Marie R., 4,391,744, Cl. 252-522.00R.
Boden, Richard M., 4,391,999, Cl. 568-840.000.
Mookherjee, Braja D.; Trenkle, Robert W.; Chant, Bernard J.; Ouwerkerk, Anton V.; Kamath, Venkatesh; and Mussinan, Cynthia J., 4,391,717, Cl. 252-8.600.
Sprecker, Mark A.; Hanna, Marie R.; Tokarzewski, Richard J.; Belko, Robert P.; Watkins, Hugh; and Vock, Manfred H., 4,391,284, Cl. 131-276.000.
International Harvester Co.: *See—*
Birkenbach, Eugen J., 4,391,335, Cl. 172-540.000.
International Paper Company: *See—*
Phillips, Richard B., 4,391,670, Cl. 162-12.000.
Self, Robert W.; and Whillock, Allan A., 4,391,833, Cl. 426-523.000.
International Shoe Machine Corporation: *See—*
Becka, Michael M., 4,391,012, Cl. 12-10.500.
International Telephone & Telegraph Corp.: *See—*
Einem, Robert E., 4,391,541, Cl. 400-248.000.
InterNorth, Inc.: *See—*
Busse, Paul J., 4,391,735, Cl. 252-413.000.
Intlekofer, Michael J.; Hanson, Jay R.; and Lee, Thomas E., to Western Marine Electronics, Inc. Radar system. 4,392,137, Cl. 343-5.0SC.
Intraco, Inc.: *See—*
Hall, Benjamin O.; and Arndt, Thomas W., 4,391,361, Cl. 198-735.000.
Irani, Cyrus A.: *See—*
Mintz, Donald; and Irani, Cyrus A., 4,391,925, Cl. 523-130.000.
Irwin, George H.: *See—*
Ederle, John A.; Hoer, Ralph A.; and Irwin, George H., 4,391,840, Cl. 426-641.000.
Ishihara, Toshinobu; Yamamoto, Akira; and Taguchi, Kenichi, to Schin-Etsu Chemical Co., Ltd. Alkynyl halide compounds and alkenyl acetate compounds therefrom. 4,391,984, Cl. 560-236.000.
Ishii, Akiyasu: *See—*
Ueno, Kunihiko; Ishii, Akiyasu; Hukuda, Masazi; and Nakayama, Kazuyuki, 4,391,763, Cl. 264-15.000.
Ishii, Koji; Shinmoto, Takahiko; and Machara, Kenso, to Ryobi Ltd. Plate holding device for offset duplicator. 4,391,193, Cl. 101-415.100.
Ishii, Yoshiya: *See—*
Dohshita, Hidetoshi; Ishii, Yoshiya; and Fujitani, Nobuyuki, 4,391,241, Cl. 123-198.0DB.
Ishijima, Koji: *See—*
Tanaka, Hideharu; Ishijima, Koji; and Koda, Toshihide, 4,391,573, Cl. 418-63.000.
Ishikawa, Shinzaburo; Kasai, Kenji; Kaminaka, Nobuyuki; and Adachi, Tetuo, to Matsushita Electric Industrial Co., Ltd. Magnetoresistance effect type head. 4,392,166, Cl. 360-113.000.
Ishikawa, Shozo: *See—*
Mabuchi, Minoru; Sakai, Kiyoshi; Ishikawa, Shozo; Egashira, Yuji; and Kitahara, Makoto, 4,391,889, Cl. 430-59.000.
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Ishler, William E.; Weber, William B.; and Giudici, Livio L., to General Electric Company. Attachment of base to lamp unit. 4,392,076, Cl. 313-318.000.
Iso, Yoshimi; Inoue, Shigeki; and Shibuya, Toshifumi, to Hitachi, Ltd. Stereo demodulation system for an FM stereo broadcast receiver. 4,392,020, Cl. 179-1.0GE.

Isobe, Yukihiro: *See*—
Hosaka, Akihiko; Okuyama, Kiyotaka; and Isobe, Yukihiro, 4,391,864, Cl. 428-64.000.

Isogawa, Takayuki: *See*—
Takematsu, Tetsuo; Isogawa, Takayuki; and Sakuraba, Yasuya, 4,391,631, Cl. 71-118.000.

Itek Corporation: *See*—
McLaughlin, Joseph L., 4,391,526, Cl. 356-359.000.

Ito, Shinzo, to Nippondenso Co., Ltd. Method and apparatus for measuring an injection amount from an injection device for use with an engine. 4,391,133, Cl. 73-119.00A.

Ito, Sumio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Electronically controlling fuel injection method. 4,391,253, Cl. 123-478.000.

Ito, Yoji: *See*—
Inoue, Yozo; Ito, Yoji; Hara, Kiyoshi; Usami, Kiyoshi; and Iwata, Yasuhiro, 4,391,320, Cl. 165-2.000.

Itoh, Kunio; Sugino, Takashi; Wada, Masaru; and Shimizu, Hirokazu, to Matsushita Electric Industrial Co., Ltd. Terraced substrate semiconductor laser. 4,392,227, Cl. 372-46.000.

Itoh, Kunio: *See*—
Okabe, Takako; Itoh, Kunio; and Sugino, Takashi, 4,392,228, Cl. 372-46.000.

Ivy, Jessie T. Wind and water power generator. 4,392,060, Cl. 290-53.000.

Iwama, Shinichi; and Egasaki, Takashi, to Daiwa Seiko Inc. Spinning reel brake. 4,391,419, Cl. 242-84.50A.

Iwasaki, Shoji: *See*—
Ohhashi, Shiro; Ubusawa, Fumiyoshi; Iwasaki, Shoji; and Manaka, Tetsuyuki, 4,392,243, Cl. 455-74.000.

Iwata, Hideki, to Nel-Tech Development, Inc. Multiplex communication system using remote microprocessors. 4,392,125, Cl. 340-518.000.

Iwata, Yasuhiro: *See*—
Inoue, Yozo; Ito, Yoji; Hara, Kiyoshi; Usami, Kiyoshi; and Iwata, Yasuhiro, 4,391,320, Cl. 165-2.000.

Iwatani, Shiro, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device. 4,392,151, Cl. 357-72.000.

Izawa, Ryuichi: *See*—
Aoki, Masakazu; Ando, Haruhisa; Ohba, Shinya; Hanamura, Shoji; Takemoto, Iwao; and Izawa, Ryuichi, 4,392,158, Cl. 358-213.000.

Izraeli, Hyman, to Thomas & Betts Corporation. Cable covering method using an expandable insulative sleeve. 4,391,661, Cl. 156-49.000.

J. B. Foote Foundry Co., The: *See*—
Wood, Thomas D.; Reiss, Garry K.; and Overly, Larry L., 4,391,595, Cl. 474-33.000.

J. I. Case Company: *See*—
Smith, Wayne G.; and Maurer, Herman J., 4,391,050, Cl. 37-142.00A.
Vietor, Francis H., 4,391,563, Cl. 414-698.000.

J. M. Huber Corporation: *See*—
Fusco, Gerard A.; and van Lier, Glenn, 4,391,638, Cl. 106-20.000.

J. R. Simplot Company: *See*—
Galland, Lesley A.; and Skiver, Bruce W., 4,391,172, Cl. 83-403.000.

J. S. Staedtler KG: *See*—
Rosel, Hans-Dieter, 4,392,147, Cl. 346-140.00R.

Jabben, Gary D., to Western Electric Company, Inc. Circuit board and contact assemblies. 4,392,181, Cl. 361-401.000.

Jackisch, Rudolph. Internal-combustion engine. 4,391,233, Cl. 123-61.00R.

Jacklin, Roger L., to Deere & Company. Bevel gear and pinion drive with biased thrust bearing. 4,391,157, Cl. 74-402.000.

Jackson, Charles F. C.: *See*—
Trumble, William P.; Finn, Roger C.; and Jackson, Charles F. C., 4,392,014, Cl. 174-92.000.

Jackson, Charles R. Phase-locked loop including non-linear phase detector of the sample and hold type. 4,392,113, Cl. 331-14.000.

Jackson, G. C., Jr.; Bramlett, Kenneth W.; and Dennis, James G., to Dresser Industries, Inc. Quick release downhole motor coupling. 4,391,547, Cl. 403-341.000.

Jackson, Ian D.; Berry, Derek; Rowden, George A.; and Dilley, Malcolm, to Davy McKee (Minerals & Metals) Limited. Method of, and apparatus for, effecting liquid-liquid contact. 4,391,711, Cl. 210-634.000.

Jacobsen, Kjell O.; and Engen, Gudmund, to A/S Raufoss Ammunisjonsfabrikker. Smoke cartridge. 4,391,197, Cl. 102-334.000.

Jacobson, Gerald D. Tire chain with attaching device. 4,391,315, Cl. 152-213.00A.

Jaegers, Huber: *See*—
Forster, Siegfried; Quell, Peter; and Jaegers, Huber, 4,391,227, Cl. 122-16.000.

Jaggle, Gunther; Peters, Klaus-Jurgen; and Riel, Klaus, to Robert Bosch GmbH. Fuel injection system. 4,391,252, Cl. 123-454.000.

Jakobs, Karlhans: *See*—
Reitz, Gunther; Jakobs, Karlhans; and Boehmke, Gunther, 4,391,718, Cl. 252-8.700.

James, John: *See*—
Eckels, Calvin; and James, John, 4,392,248, Cl. 455-161.000.

James, William A.: *See*—
Cook, John R.; and James, William A., 4,391,869, Cl. 428-218.000.

Janc, Robert V.: *See*—
Jasper, Steven C.; and Janc, Robert V., 4,392,138, Cl. 343-103.000.

Janis, Patrick K.: *See*—
Salsky, Jerome; Janis, Patrick K.; and Branen, Kenneth E., 4,391,088, Cl. 57-234.000.

Janiszewski, Grzegorz K.: *See*—
Weiertz, Stig H. A.; and Janiszewski, Grzegorz K., 4,391,164, Cl. 74-781.00R.

Janome Sewing Machine Co., Ltd.: *See*—
Tamiya, Yoshimichi; Eguchi, Yasukata; and Makabe, Hachiro, 4,391,212, Cl. 112-158.00E.

Janssen, Craig R., to Padco, Inc. Finishing tool for smoothing wallboard tape joints. 4,391,013, Cl. 15-210.00R.

Janssen, Sylvain; and Sequies, Jean, to Giers. Fluid-pressure responsive apparatus. 4,391,145, Cl. 73-704.000.

Janssens, Wilhelmus G. E.; and Merges, Heinz, to U.S. Philips Corporation. Hand-held hair dryer. 4,391,047, Cl. 34-97.000.

Japan Organo Co., Ltd.: *See*—
Shimizu, Hiroshi; Sakai, Sigeo; Matsuda, Fumihiko; and Matsumoto, Reiko, 4,391,649, Cl. 127-46.200.

Jasper, Steven C.; and Janc, Robert V., to Motorola, Inc. Apparatus and method for detecting and inhibiting signals interfering with a Loran C signal. 4,392,138, Cl. 343-103.000.

Jenkins, Jon A., to IMED Corporation. Apparatus for providing a controlled flow of intravenous fluid to a patient. 4,391,599, Cl. 604-118.000.

Jennings, William B.: *See*—
Ciarlei, Joseph A.; Tobin, Curtis L.; and Jennings, William B., 4,391,322, Cl. 165-125.000.

Jensen, Bruno: *See*—
Nelson, John W.; and Jensen, Bruno, 4,391,151, Cl. 73-863.230.

Jeschke, Peter; and Plath, Jurgen, to Didier-Werke A.G. Sliding closure unit. 4,391,392, Cl. 222-598.000.

Jin, Sungho; and Tiefel, Thomas H., to Bell Telephone Laboratories, Incorporated. Isotropic and nearly isotropic permanent magnet alloys. 4,391,656, Cl. 148-102.000.

Jirousek, Norman F.; and Shipitalo, William M., to Towmotor Corporation. Parking disc brake actuator. 4,391,351, Cl. 188-18.00A.

Jo, Byeong H.; and Zucker, Jerry, to RM Industrial Products Company, Inc. Asbestos products of improved physical properties having metal oxides on the surfaces thereof. 4,391,875, Cl. 428-378.000.

John Wyeth and Brother Limited: *See*—
Crossley, Roger, 4,391,752, Cl. 260-239.30B.

Johnson, Avery A., Jr.: *See*—
Mason, Arthur D., Jr.; Johnson, Avery A., Jr.; and Ritchey, Charles R., 4,391,799, Cl. 424-132.000.

Johnson, Grannis S.: *See*—
Marcellis, Alphonso W.; and Johnson, Grannis S., 4,391,645, Cl. 106-90.000.

Johnson & Johnson Baby Products Company: *See*—
Cook, John R.; and James, William A., 4,391,869, Cl. 428-218.000.

Johnson & Johnson Dental Products Company: *See*—
Monfredo, Joseph R.; and Roth, Ronald H., 4,391,589, Cl. 433-63.000.

Johnson, Michael R.: *See*—
Harbert, Charles A.; Johnson, Michael R.; and Melvin, Lawrence S., Jr., 4,391,827, Cl. 424-331.000.

Johnson, Robert D., to Dow Corning Corporation. Elastomeric silicone sponge. 4,391,921, Cl. 521-66.000.

Johnson, Robert L. Board game. 4,391,449, Cl. 273-260.000.

Johnson, Virgil E., Jr.; Sundaram, T. R.; and Conn, Andrew F., to Hydronautics, Incorporated. Cavitating liquid jet assisted drill bit and method for deep-hole drilling. 4,391,339, Cl. 175-393.000.

Jones, Darrell D.: *See*—
Cronan, John M.; Haynes, Joseph M.; and Jones, Darrell D., 4,391,347, Cl. 182-113.000.

Jones, Darrell L., to Vetco Offshore, Inc. Mooring system bearing for a tensioned leg platform. 4,391,554, Cl. 405-224.000.

Joormann, Hendrik J. M., to U.S. Philips Corporation. Magnetic head, method of producing the magnetic head. 4,392,167, Cl. 360-120.000.

Jorgens, Douglas M. One-hand key ring. 4,391,113, Cl. 70-459.000.

Joyce Card & Display Co.: *See*—
Joyce, Robert D., 4,391,375, Cl. 211-13.000.

Joyce, Robert D., to Joyce Card & Display Co. Display card and assembly hanger. 4,391,375, Cl. 211-13.000.

Juang, Mike S. D.: *See*—
Falk, John C.; and Juang, Mike S. D., 4,391,948, Cl. 525-57.000.

Juguin, Bernard: *See*—
Cosyns, Jean; Juguin, Bernard; Le Page, Jean-Francois; and Miquel, Jean, 4,392,002, Cl. 585-329.000.

Jung, Harald: *See*—
Schafer, Ewald; and Jung, Harald, 4,391,106, Cl. 66-193.000.

Junginger, Robert: *See*—
Struck, Bernd D.; Junginger, Robert; and Boltersdorf, Dagmar, 4,391,682, Cl. 204-104.000.

Jurd, Leonard, to United States of America, Agriculture. Dibutylorthobenzylmethoxybenzenes and dibutylorthocinnamylmethoxybenzenes as mosquito larvae growth inhibitors. 4,391,828, Cl. 424-340.000.

K-V Associates, Inc.: *See*—
Kerfoot, William B.; and Skinner, Stuart M., Jr., 4,391,137, Cl. 73-204.000.

Kabushiki Kaisha Daini Seikosha: *See*—
Hara, Yoshiaki, 4,391,532, Cl. 368-250.000.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Ichikawa, Katsumi; Amano, Itaru; Ozaki, Keiji; and Suzuki, Seiichi, 4,391,769, Cl. 264-326.000.
Kawamura, Teruaki; Harada, Nobuhiko; Komatsu, Yukihiko; and Sakai, Masaru, 4,391,016, Cl. 15-302.000.

Kabushiki Kaisha Morita Seisakusho: *See*—
Matsui, Takahiro, 4,391,588, Cl. 433-33.000.

Kabushiki Kaisha Nichidenshi Technica: *See*—
Sato, Takeshi; and Suzaki, Shunichi, 4,392,054, Cl. 250-307.000.
Kabushiki Kaisha Suwa Seikosha: *See*—
Tsuji, Masuo, 4,392,216, Cl. 368-71.000.
Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See*—
Tanaka, Kobun; and Kawaharazaki, Takashi, 4,391,023, Cl. 24-230.0AL.
Kadim, Azriel, to Orlite Engineering Ltd. Ammunition magazine. 4,391,055, Cl. 42-50.000.
Kagan, Jonathan, to Becton, Dickinson and Company. Filtered hub device for aspirating and injecting liquids. 4,391,274, Cl. 604-190.000.
Kaganowicz, Grzegorz; and Robinson, John W., to RCA Corporation. Adherent perfluorinated layers. 4,391,843, Cl. 427-41.000.
Kagi, Erwin: *See*—
Muller, Michael; Scherrer, Herbert; and Kagi, Erwin, 4,391,536, Cl. 400-144.200.
Kai, Tomokazu, to Nippon Electric Co., Ltd. Mobile communication system. 4,392,242, Cl. 455-33.000.
Kaiser, Karl; and Ohorodnik, Alexander, to Hoechst Aktiengesellschaft. Continuous removal of residual hydrocarbons from polyolefins. 4,391,972, Cl. 528-499.000.
Kaiser, Siegfried: *See*—
Huhn, Helmut; and Kaiser, Siegfried, 4,391,302, Cl. 138-118.100.
Kakabu, Shinzo: *See*—
Aya, Masahiro; Saito, Junichi; Yasui, Kazuomi; Kakabu, Shinzo; Kamochi, Atsumi; and Yamaguchi, Naoko, 4,391,629, Cl. 71-94.000.
Kali-Chemie Pharma GmbH: *See*—
Thies, Peter W.; and David, Samuel, 4,391,819, Cl. 424-278.G30.
Kalvinskas, John J.; and Rohatgi, Naresh K., to United States of America, National Aeronautics and Space Administration. Hydrodesulfarization of chlorinized coal. 4,391,609, Cl. 44-1.0SR.
Kamath, Venkatesh: *See*—
Mookherjee, Braja D.; Trenkle, Robert W.; Chant, Bernard J.; Ouwerkerk, Anton V.; Kamath, Venkatesh; and Mussinan, Cynthia J., 4,391,717, Cl. 252-8.600.
Kamegaya, Takeo; Sekigawa, Tadahiko; Kurakami, Hiroshi; and Suzuki, Yoshiro, to Okaya Electric Industries Co., Ltd. Gas discharge display panel. 4,392,075, Cl. 313-584.000.
Kamel, Fouad A., to Whitin Roberts Company. Apron drafting system. 4,391,021, Cl. 19-253.000.
Kamezaki, Yasushi; Inoue, Eiichi; Nishihama, Hitoshi; Fushida, Akira; and Matsumoto, Joji, to Mita Industrial Co., Ltd. Multiple copy electrophotographic process using dye sensitized ZnO. 4,391,892, Cl. 430-126.000.
Kaminaka, Nobuyuki: *See*—
Ishikawa, Shinzaburo; Kanai, Kenji; Kaminaka, Nobuyuki; and Adachi, Tetuo, 4,392,166, Cl. 360-113.000.
Kamochi, Atsumi: *See*—
Aya, Masahiro; Saito, Junichi; Yasui, Kazuomi; Kakabu, Shinzo; Kamochi, Atsumi; and Yamaguchi, Naoko, 4,391,629, Cl. 71-94.000.
Kampf, Gunther: *See*—
Schmid, Helmut; Bock, Martin; and Kampf, Gunther, 4,391,522, Cl. 356-326.000.
Kamyr, Inc.: *See*—
Funk, Erwin D., 4,391,468, Cl. 299-8.000.
Kanai, Kenji: *See*—
Ishikawa, Shinzaburo; Kanai, Kenji; Kaminaka, Nobuyuki; and Adachi, Tetuo, 4,392,166, Cl. 360-113.000.
Kanazawa, Yukio. Hair cutting device. 4,391,040, Cl. 30-201.000.
Kanbe, Junichiro: *See*—
Tamura, Yasuyuki; Kanbe, Junichiro; Nakamura, Shunji; Toyono, Tsutomu; and Takahashi, Tohru, 4,391,891, Cl. 430-120.000.
Kanda, Yoshitsugu; Kurikawa, Minoru; Morimoto, Toru; and Nakanishi, Kiyoshi, to N.D.C. Co., Ltd. Method of making a bearing material containing an aluminum base alloy. 4,391,854, Cl. 427-192.000.
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Yamane, Kazumasa; Kobayashi, Masahiro; and Takada, Masaniko, 4,391,944, Cl. 524-548.000.
Kansas University Endowment Association: *See*—
Frenkel, Jacob K.; and Smith, Donald D., 4,391,822, Cl. 424-283.000.
Kanyo, Kalman: *See*—
Levi, George W.; and Kanyo, Kalman, 4,391,307, Cl. 140-140.000.
Kanzaki Paper Manufacturing Co., Ltd.: *See*—
Nakamura, Mikio; and Miyake, Makoto, 4,391,852, Cl. 427-150.000.
Kaplan, Jonathan I., to Polaroid Corporation. Electric wire terminal connecting method. 4,391,039, Cl. 29-884.000.
Kapoor, Mohan L.: *See*—
Rebeschi, Thomas J.; and Kapoor, Mohan L., 4,392,084, Cl. 315-169.400.
Karl Kassbohrer Fahrzeugwerke GmbH: *See*—
Marti, Ernst, 4,391,002, Cl. 4-321.000.
Karl Otto Braun K.G.: *See*—
Schafer, Ewald; and Jung, Harald, 4,391,106, Cl. 66-193.000.
Karner & Co AB: *See*—
Karner, Franz, 4,391,395, Cl. 223-94.000.
Karner, Franz, to Karner & Co AB. Clothes hanger. 4,391,395, Cl. 223-94.000.
Katayama, Tsutomu; and Nakanishi, Toyohiko, to Fuji Oil Company, Limited. Method for making simulated tofu products. 4,391,835, Cl. 426-573.000.
Kato, Osamu: *See*—
Uemura, Seiichi; Yamamoto, Shunichi; Hirose, Takao; Takashima, Hiroaki; and Kato, Osamu, 4,391,788, Cl. 423-447.600.
Kato, Shingo: *See*—
Nakauchi, Hideo; Kato, Shingo; and Ando, Yukio, 4,391,942, Cl. 524-526.000.
Katoh, Hiroshi: *See*—
Takechi, Hiroshi; Katoh, Hiroshi; Koyama, Kazuo; and Usami, Kazuhide, 4,391,653, Cl. 148-12.00C.
Katoh, Sunao: *See*—
Makizuka, Takakazu; and Katoh, Sunao, 4,392,205, Cl. 364-518.000.
Kawabata, Etsuo; Ogura, Masahiko; Takagi, Akinobu; and Fujimura, Akira, to Honda Giken Kogyo Kabushiki Kaisha. Throttle opener device for vehicle engines. 4,391,246, Cl. 123-391.000.
Kawahara, Hiroshi: *See*—
Shibata, Fujio; Kawahara, Hiroshi; and Azegami, Hitoshi, 4,391,877, Cl. 428-457.000.
Kawaharazaki, Takashi: *See*—
Tanaka, Kobun; and Kawaharazaki, Takashi, 4,391,023, Cl. 24-230.0AL.
Kawai, Hisasi: *See*—
Egami, Tsuneyuki; Kawai, Hisasi; Kohama, Tokio; and Obayashi, Hideki, 4,391,132, Cl. 73-118.000.
Kawai, Shinji; Suzuki, Koichi; and Yamaguchi, Yuji, to Ainin Seiki Kabushiki Kaisha. Spraying device for use in toilet bowls. 4,391,004, Cl. 4-443.000.
Kawamoto, Tamotsu: *See*—
Kimura, Kazuo; Takayama, Kenichiro; Ado, Yutaka; Kawamoto, Tamotsu; and Masunaga, Izumi, 4,391,910, Cl. 435-232.000.
Kawamura, Teruaki; Harada, Nobuhiko; Komatsu, Yukihiko; and Sakai, Masaru, to Kabushiki Kaisha Kobe Seiko Sho. Degreasing apparatus for elongated materials. 4,391,016, Cl. 15-302.000.
Kay Laboratories, Inc.: *See*—
Arrhenius, Gustaf O., 4,391,267, Cl. 126-400.000.
Keathley, Anthony C.; Stanton, Howard F.; and Wagle, Mahesh M., to Tubing Technology, Inc. Shear forming apparatus for elongated non-rotating metal tubes. 4,391,114, Cl. 72-78.000.
Keenan, John R., to General Signal Corp. Packing for equalizing reservoir cut-out valve. 4,391,293, Cl. 137-312.000.
Keep, Henry, Jr. Railroad switch heater. 4,391,425, Cl. 246-428.000.
Keisuke Honda: *See*—
Kurata, Hisao, 4,392,144, Cl. 346-139.00C.
Keith, Charles W., Jr.: *See*—
Mitchell, Larry D.; and Keith, Charles W., Jr., 4,391,007, Cl. 5-60.000.
Keldmann, Erik C. V., to Elpan ApS. Temperature regulating system for the control of temperature in a room. 4,391,913, Cl. 236-36.000.
Keller, Wolfgang; Grassmann, Hans-Christian; and Schmidt, Karl, to Siemens Aktiengesellschaft. Method and apparatus for the manufacture of silicon by crucible-free zone melting. 4,392,230, Cl. 373-139.000.
Kellwood Company: *See*—
Lawson, J. William; and Matthews, Robert M., 4,390,999, Cl. 2-409.000.
Kelly, Thomas J.; and Robinson, Mark L., to Huntington Alloys, Inc. Weldable oxide dispersion strengthened alloys. 4,391,634, Cl. 75-124.000.
Kelsey-Hayes Company: *See*—
Evans, Anthony C., 4,391,355, Cl. 188-73.440.
Rozmus, Walter J., 4,391,614, Cl. 55-2.000.
Kembo, Yukio: *See*—
Akiyama, Nobuyuki; Kembo, Yukio; Nakagawa, Yasuo; Aiuchi, Susumu; and Nomoto, Mineo, 4,391,511, Cl. 355-40.000.
Kende, Andrew S.; Curran, Dennis P.; King, Margaret L.; and Feldstein, Neil A., to University of Rochester, The. Intermediates for the production of picropodophyllin and related compounds and processes for the preparation and use thereof. 4,391,982, Cl. 549-433.000.
Kennedy, Robert P.: *See*—
Greene, Richard A.; and Kennedy, Robert P., 4,391,038, Cl. 29-829.000.
Kent, William C., to Western Electric Company, Inc. Apparatus for applying fluid to articles. 4,391,220, Cl. 118-707.000.
Kerfoot, William B.; and Skinner, Stuart M., Jr., to K-V Associates, Inc. Groundwater flow meter. 4,391,137, Cl. 73-204.000.
Kernforschungsanlage Julich GmbH: *See*—
Forster, Siegfried; Quell, Peter; and Jaegers, Huber, 4,391,227, Cl. 122-16.000.
Iniotakis, Nicolaos, 4,391,615, Cl. 55-16.000.
Struck, Bernd D.; Junginger, Robert; and Boltersdorf, Dagmar, 4,391,682, Cl. 204-104.000.
Kersting, Hans-Joachim; Wolfrum, Erhard; Portz, Willi; and Straus, Georg, to Hoechst Aktiengesellschaft. Production of calcium carbide. 4,391,786, Cl. 423-442.000.
Kessler, Rolf: *See*—
Holl, Helmar; and Kessler, Rolf, 4,391,214, Cl. 112-269.100.
Keystone Consolidated Industries, Inc.: *See*—
Heaslip, Lawrence J.; Hohulin, Alphia L.; and Mitchell, Joseph R., 4,391,319, Cl. 164-259.000.
Kiefer, Karl, to TRW Inc. Apparatus and method for installing and energizing submergible pump in underwater well. 4,391,330, Cl. 166-341.000.
Kihira, Masafumi: *See*—
Hamane, Tokuhito; Kinoshita, Toshio; Kihira, Masafumi; Hamada, Hitosi; and Gotou, Mikio, 4,391,306, Cl. 140-92.100.
Kikuchi, Toshiaki: *See*—
Shono, Hiroaki; and Kikuchi, Toshiaki, 4,391,619, Cl. 65-12.000.
Kimura, Akio: *See*—
Suzuki, Togi; Tsunawaki, Kiyokazu; Wada, Osamu; and Kimura, Akio, 4,391,872, Cl. 428-224.000.

**Kimura, Kazuo; Takayama, Kenichiro; Ado, Yutaka; Kawamoto, Tamotsu; and Masunaga, Izumi, to Kyowa Hakko Kogyo Co., Ltd.** Processes for producing thermophilic aspartase. 4,391,910, Cl. 435-232.000.

**Kimura, Takeo:** *See*—
Ohmura, Kaoru; Kimura, Takeo; and Kusunose, Tetsuhiro, 4,392,013, Cl. 174-68.500.

**King, Margaret L.:** *See*—
Kende, Andrew S.; Curran, Dennis P.; King, Margaret L.; and Feldstein, Neil A., 4,391,982, Cl. 549-433.000.

**Kinoshita, Toshio:** *See*—
Hamane, Tokuhito; Kinoshita, Toshio; Kihira, Masafumi; Hamada, Hitosi; and Gotou, Mikio, 4,391,306, Cl. 140-92.100.

**Kinter, Malcolm:** *See*—
Yokota, Dick; Kuty, David; and Kinter, Malcolm, 4,391,531, Cl. 368-239.000.

**Kippax, John W.:** *See*—
Harris, Norman; Flintoff, John F.; and Kippax, John W., 4,391,677, Cl. 203-28.000.

**Kishida, Toshikatsu:** *See*—
Murakami, Tadashi; and Kishida, Toshikatsu, 4,391,587, Cl. 432-121.000.

**Kishimoto, Kenjiro; Igarashi, Hideaki; and Kono, Migaki, to Yuasa Battery Company Limited.** Process for producing sealed lead-acid battery. 4,391,036, Cl. 29-623.200.

**Kitahara, Makoto:** *See*—
Mabuchi, Minoru; Sakai, Kiyoshi; Ishikawa, Shozo; Egashira, Yuji; and Kitahara, Makoto, 4,391,889, Cl. 430-59.000.

**Kitamura, Nobu:** *See*—
Hori, Hisako; Kitamura, Nobu; Shirahata, Isao; and Nakamura, Nobuyuki, 4,391,955, Cl. 525-462.000.

**Kitamura, Shuji:** *See*—
Mashio, Fujio; and Kitamura, Shuji, 4,391,945, Cl. 524-600.000.

**Kitane, Syoiti; Honjo, Shigeru; Ohe, Kuniyoshi; and Tobioka, Fumio, to Tokyo Shibaura Denki Kabushiki Kaisha.** Method for manufacturing semiconductor substrate. 4,391,658, Cl. 148-188.000.

**Klaiber, George S.:** *See*—
Grajek, Stanley A.; Hill, Robert S.; and Klaiber, George S., 4,391,177, Cl. 84-196.000.

**Klein-Albenhausen, Heinrich, to Ibau Hamburg Ingenieurgisillschaft Endustreibau mbH.** Silo system for mixing stored material. 4,391,528, Cl. 366-15.000.

**Kleine, Willi; and Frey, Werner, to Wacker-Chemie GmbH.** Process for the polymerization of vinyl halide polymers. 4,391,960, Cl. 526-74.000.

**Kleinschmidt, Peter; and Magori, Valentin, to Siemens Aktiengesellschaft.** Trigger device and piezo-ignition coupler with galvanic decoupling. 4,392,074, Cl. 310-327.000.

**Kneip, Fernand; and Marnach, Ernest, to Goodyear Tire & Rubber Company, The.** Self-checking safety mat. 4,392,176, Cl. 361-160.000.

**Knepper, Hermann, to Brinkmann, Heinrich Bernhard.** Method for making of solid fertilizer by separation of liquid manure and device for carrying out this method. 4,391,623, Cl. 71-21.000.

**Knight, Houston W., to FMC Corporation.** Mono-rail boom supported articulated service line. 4,391,297, Cl. 137-615.000.

**Knobloch, Joy E.** Animal feed composition and method for producing same. 4,391,831, Cl. 426-93.000.

**Knoll, William C.; and Bay, David L., to GTE Products Corporation.** Direct drive ballast with delayed starting circuit. 4,392,085, Cl. 315-173.000.

**Kobashi, Mamoru; Tanaka, Shinichiro; and Saji, Hideo, to Toyota Jidosha Kogyo Kabushiki Kaisha; and Nippondenso Co., Ltd.** Device of controlling the idling speed of an engine. 4,391,244, Cl. 123-339.000.

**Kobayashi, Hisao:** *See*—
Ide, Katsuyuki; Ohe, Kempo; and Kobayashi, Hisao, 4,392,086, Cl. 315-174.000.

**Kobayashi, Isao:** *See*—
Niioka, Takeharu; and Kobayashi, Isao, 4,392,246, Cl. 455-158.000.

**Kobayashi, Masahiro:** *See*—
Yamane, Kazumasa; Kobayashi, Masahiro; and Takada, Masaniko, 4,391,944, Cl. 524-548.000.

**Kobayashi, Masatsune, to Canon Kabushiki Kaisha.** Recording liquid. 4,391,639, Cl. 106-22.000.

**Kobelt, Jacob.** Fluid actuated positioner. 4,391,182, Cl. 91-378.000.

**Kocher, Johann, to Alpi Milchindustrie reg. Gen. m.b.H.** Process for the manufacture of a liquid, paste or powder whey product simulative of a skin milk product. 4,391,837, Cl. 426-583.000.

**Koda, Toshihide:** *See*—
Tanaka, Hideharu; Ishijima, Koji; and Koda, Toshihide, 4,391,573, Cl. 418-63.000.

**Koenig & Bauer AG:** *See*—
Bolza-Schunemann, Hans-Bernhard, 4,391,191, Cl. 101-216.000.
Wieland, Erich G., 4,391,192, Cl. 101-350.000.

**Kogoma, Kiyoshi; Ohashi, Yu; Niizeki, Jiro; Sone, Norio; and Tobita, Takashi, to Nisso Petrochemical Industrie Co., Ltd.** Process for the production of ethers. 4,391,994, Cl. 568-593.000.

**Kohama, Tokio:** *See*—
Egami, Tsuneyuki; Kawai, Hisasi; Kohama, Tokio; and Obayashi, Hideki, 4,391,132, Cl. 73-118.000.

**Kohler, Gerd:** *See*—
Edinger, Egon; and Kohler, Gerd, 4,391,764, Cl. 264-25.000.

**Koide, Hiroshi, to Ricoh Company, Ltd.** Driving method and apparatus for illumination type imaging system. 4,391,506, Cl. 355-8.000.

**Koine, Richard, to Rheinmetall GmbH.** Method and means for controlling the firing rate from a machine gun. 4,391,180, Cl. 89-129.00R.

**Kojima, Takafumi; Tamaki, Kenzo; and Yokota, Shiro, to Hitachi, Ltd.; and Nippon Telegraph & Telephone Public Corporation.** Subscriber line testing system. 4,392,026, Cl. 179-175.30R.

**Kokovikhin, Vasily G.:** *See*—
Yakovlev, Nikolai I.; Smolin, Anatoly T.; Kokovikhin, Vasily G.; and Kotunov, Alexei A., 4,392,106, Cl. 324-72.500.

**Kokusai Denshin Denwa Co., Ltd.:** *See*—
Ando, Sumitoshi, 4,392,222, Cl. 370-60.000.
Mori, Hiromichi; Matsumoto, Jun; and Fujioka, Masanobu, 4,392,224, Cl. 370-67.000.

**Kolb, Arthur F.; Franklin, Arthur J.; and Miller, Toby L, to Eaton Corporation.** Thermal overload relay having a N.O. or N.C. contact unit selectively addable in the field. 4,392,118, Cl. 337-154.000.

**Kollmorgen Technologies Corporation:** *See*—
Zeblisky, Rudolph J., 4,391,841, Cl. 427-12.000.

**Kolombos, Alexander J.; Telford, Clive D.; and Young, Dennis, to British Petroleum Company Limited, The.** Isobutene by dehydroisomerization of normal butane. 4,392,003, Cl. 585-661.000.

**Komatsu, Yukihiko:** *See*—
Kawamura, Teruaki; Harada, Nobuhiko; Komatsu, Yukihiko; and Sakai, Masaru, 4,391,016, Cl. 15-302.000.

**Konforti, Naim; and Marom, Emanuel, to Ramot University Authority for Applied Research & Industrial Development Ltd.** Method and apparatus for image subtraction in order to extract non-common information from two light images. 4,392,155, Cl. 358-106.000.

**Koning, Richard W.; Meiers, Gerald F.; and Anstey, Henry D., to Deere & Company.** Belt-tensioning system for round balers. 4,391,187, Cl. 100-88.000.

**Konno, Kunio:** *See*—
Suda, Tatsuo; Hirasawa, Yoshihei; Takahashi, Sachio; Abe, Etsuko; Konno, Kunio; and Aoki, Tadao, 4,391,802, Cl. 424-236.000.

**Kono, Migaki:** *See*—
Kishimoto, Kenjiro; Igarashi, Hideaki; and Kono, Migaki, 4,391,036, Cl. 29-623.200.

**Konoshima, Katunaga, to Olympus Optical Company Ltd.** Cleaning apparatus for endoscope. 4,391,287, Cl. 134-99.000.

**Koprek, Stanislaw:** *See*—
Wyszkowski, Jerzy; Panasiuk, Wladyslaw; Koprek, Stanislaw; and Piechal, Andzei, 4,391,654, Cl. 148-16.600.

**Korbonits, Dezso; Nogradi, Mihaly; Vermes nee Szluha, Borbala; Strelisky, Janos; Wolfner, Andras; Heja, Gergely; Kovacz, Gabor; Szegi, Jozsef; and Virag, Sandor, to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara R.T.** 7-Substituted benzopyranes and process for the preparation thereof. 4,391,821, Cl. 424-283.000.

**Korczak, Alexander; and Levis, William W., Jr., to BASF Wyandotte Corporation.** Propylene oxide adducts of toluenediamine. 4,391,728, Cl. 252-182.000.

**Korn, Elmer J.:** *See*—
Wang, Teh P.; and Korn, Elmer J., 4,392,044, Cl. 219-118.000.

**Kornmayer, Horst:** *See*—
Reinhard, Max; and Kornmayer, Horst, 4,391,140, Cl. 73-432.00R.

**Kornrumpf, William P., to General Electric Company.** Power relay with assisted commutation. 4,392,171, Cl. 361-5.000.

**Kosaka, Yositeru:** *See*—
Ota, Yoshihiko; and Kosaka, Yositeru, 4,392,161, Cl. 360-10.300.

**Kosar, Walter F.** Water deflector. 4,391,068, Cl. 52-97.000.

**Koski, Erkki, to Valmet OY.** Size press with coating pool suppressing arrangement. 4,391,217, Cl. 118-405.000.

**Koster, Robertus J. C., to Procter & Gamble Company, The.** Detergent composition containing low levels of amine oxides. 4,391,726, Cl. 252-99.000.

**Kosuge, Hideaki, to Nissan Motor Company, Limited.** Turbo-compound internal combustion engine. 4,391,098, Cl. 60-602.000.

**Kotunov, Alexei A.:** *See*—
Yakovlev, Nikolai I.; Smolin, Anatoly T.; Kokovikhin, Vasily G.; and Kotunov, Alexei A., 4,392,106, Cl. 324-72.500.

**Kovacs, Lloyd, to Hayssen Manufacturing Company.** Method of and apparatus for forming, filling and sealing packages. 4,391,081, Cl. 53-436.000.

**Kovacz, Gabor:** *See*—
Korbonits, Dezso; Nogradi, Mihaly; Vermes nee Szluha, Borbala; Strelisky, Janos; Wolfner, Andras; Heja, Gergely; Kovacz, Gabor; Szegi, Jozsef; and Virag, Sandor, 4,391,821, Cl. 424-283.000.

**Kovatch, Michael S.:** *See*—
Velmin, Rolf; Kovatch, Michael S.; and Mautz, Gus H., Jr., 4,391,674, Cl. 201-41.000.

**Kovats, Ferenc:** *See*—
Devenyi, Tibor; Bocsa, Klara K.; Kovats, Ferenc; Pongor, Sandor; Szabolcsi, Gertrud; and Such, Mihaly, 4,391,839, Cl. 426-626.000.

**Kowalski, Werner:** *See*—
Haas, Hans; and Kowalski, Werner, 4,391,783, Cl. 423-315.000.

**Koyama, Kazuo:** *See*—
Takechi, Hiroshi; Katoh, Hiroshi; Koyama, Kazuo; and Usami, Kazuhide, 4,391,653, Cl. 148-12.00C.

**Koziol, Konrad; and Wenk, Erich, to Conradty GmbH Metallelektroden KG.** Coated metal anode or the electrolytic recovery of metals. 4,391,695, Cl. 204-286.000.

**Krakauer, Merrill.** Control system for increasing the versatility of an all purpose merchandiser. 4,391,388, Cl. 221-76.000.

**Kramer, Wilhelm, to Schmelzbasaltwerk Kalenborn, Dr. Ing. Mauritz KG.** Process for fixing tiles in position. 4,391,664, Cl. 156-71.000.

**Krause, Siegfried:** *See*—
Falkenburg, Hans R.; Krause, Siegfried; and McGuiness, Robert C., 4,391,965, Cl. 528-112.000.

**Krautkramer-Branson, Inc.:** *See*—
Diederichs, Rolf, 4,391,144, Cl. 73-629.000.

Kreeger, Elsmer W.: *See*—
Stahl, Edward L.; and Kreeger, Elsmer W., 4,391,369, Cl. 206-506.000.

Krekeler, Claude B., to Cincinnati Mine Machinery Company, The. Core eliminator for mining, road working or earth moving machinery. 4,391,472, Cl. 299-86.000.

Krempl, Peter W.; Claassen, Peter; and Zeiringer, Rudolf, to List, Hans. Transducer device for measuring mechanical values on hollow bodies. 4,391,147, Cl. 73-730.000.

Krikava, James A.: *See*—
Pesce, Eugene B.; and Krikava, James A., 4,391,230, Cl. 123-25.00E.

Krill, Alvin G.: *See*—
Young, Jack W.; and Krill, Alvin G., 4,392,128, Cl. 340-616.000.

Kronert, Curt: *See*—
Benthake, Heinz; Kronert, Curt; and Kunnen, Josef, 4,391,163, Cl. 74-768.000.

Kronman, Albert F., to Hosposable Products Inc. Disposable draw sheet. 4,391,010, Cl. 5-484.000.

Kroy Inc.: *See*—
Connoy, Thomas P., 4,391,539, Cl. 400-208.000.

Kruckenberg, Winfried; Schundehutte, Karl H.; and Hederich, Volker, to Bayer Aktiengesellschaft. Azo polyether dyestuffs, formulations of these dyestuffs, their preparation and their use. 4,391,606, Cl. 8-525.000.

Krumm, Heinz: *See*—
Hedrich, Wilhelm; Krumm, Heinz; and Haeuser, Erhard, 4,391,529, Cl. 366-266.000.

Kruse, Uno: *See*—
Herman, Daniel F.; and Kruse, Uno, 4,391,928, Cl. 523-201.000.

Krutak, James J., Sr.: *See*—
Frishberg, Mark D.; and Krutak, James J., Sr., 4,391,886, Cl. 430-41.000.

Krynock, Robert A., to FMC Corporation. Method of and apparatus for separating elongated articles by length. 4,391,374, Cl. 209-540.000.

Kubo, Seitoku; Kuramochi, Koujiro; and Terakura, Yukio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Hydraulic fluid pressure control system for an automatic transmission. 4,391,166, Cl. 74-869.000.

Kubota, Ltd.: *See*—
Murakami, Shinichi; Morichika, Toshiaki; Hiraishi, Hisashi; and Shiokawa, Hiroyuki, 4,391,635, Cl. 75-125.000.

Kubota, Yutaka: *See*—
Abe, Yoshiaki; Kubota, Yutaka; and Sugimoto, Hitoshi, 4,391,237, Cl. 123-179.00H.

Kuch, Philip L.; Herrington, Daniel R.; and Eggett, Janet M., to Standard Oil Company, The. Organo-monovalent aurus complex catalysts for the manufacture of olefin oxides. 4,391,756, Cl. 260-430.000.

Kudo, Kin-ichi: *See*—
Okoshi, Noboru; Kudo, Kin-ichi; and Shimoyama, Shoichi, 4,391,640, Cl. 106-29.000.

Kudoh, Masaru: *See*—
Shinoi, Tsuyoshi; Mochizuki, Keisuke; Suzuki, Yoshimi; Kudoh, Masaru; and Hashimoto, Wataru, 4,392,024, Cl. 179-99.00R.

Kugele, Thomas G.; and Gilmore, Dennis W., to Carstab Corporation. Organic antimony containing stabilizer compositions for halogenated polymers. 4,391,757, Cl. 260-446.000.

Kuhls, Jurgen; Mayer, Franz; and Fitz, Herbert, to Hoechst Aktiengesellschaft. Fluoropolymers with shell-modified particles, and processes for their preparation. 4,391,940, Cl. 524-458.000.

Kuhn, Werner: *See*—
Zilske, Wolfgang; and Kuhn, Werner, 4,391,679, Cl. 204-43.00G.

Kuhnlein, Hans, to Siemens Aktiengesellschaft. Brushless D-C motor. 4,392,094, Cl. 318-254.000.

Kumar, Niraj; and Mouthon, Marc, to Ebauches Electroniques, S.A. Device for controlling correction operations of a time display device. 4,392,217, Cl. 368-188.000.

Kung, Edward J.; and Bednard, Eugene D., to Shell Oil Company. Current impulse method and apparatus for testing geophone strings. 4,392,213, Cl. 367-13.000.

Kuniyoshi, Masateru, to Tokyo Shibaura Denki Kabushiki Kaisha. Starting system for brushless motor. 4,392,099, Cl. 318-797.000.

Kunnen, Josef: *See*—
Benthake, Heinz; Kronert, Curt; and Kunnen, Josef, 4,391,163, Cl. 74-768.000.

Kurakami, Hiroshi: *See*—
Kamegaya, Takeo; Sekigawa, Tadahiko; Kurakami, Hiroshi; and Suzuki, Yoshiro, 4,392,075, Cl. 313-584.000.

Kuramochi, Koujiro: *See*—
Kubo, Seitoku; Kuramochi, Koujiro; and Terakura, Yukio, 4,391,166, Cl. 74-869.000.

Kuraray Company, Limited: *See*—
Saito, Koichi; and Ohara, Osamu, 4,391,857, Cl. 427-385.500.

Kurata, Hisao, to Keisuke Honda. Recording unit. 4,392,144, Cl. 346-139.00C.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Ueno, Kunihiko; Ishii, Akiyasu; Hukuda, Masazi; and Nakayama, Kazuyuki, 4,391,763, Cl. 264-15.000.

Kurikawa, Minoru: *See*—
Kanda, Yoshitsugu; Kurikawa, Minoru; Morimoto, Toru; and Nakanishi, Kiyoshi, 4,391,854, Cl. 427-192.000.

Kuschel, Frank; Demus, Dietrich; Pfeiffer, Doris; and Deutscher, Hans-Joachim, to VEB Werk fuer Fernsehelektronik Berlin im VEB Kombinat Mikroelektronik. Nematic liquid crystal compounds and use and device for using the same. 4,391,730, Cl. 252-299.100.

Kusunose, Tetsuhiro: *See*—
Ohmura, Kaoru; Kimura, Takeo; and Kusunose, Tetsuhiro, 4,392,013, Cl. 174-68.500.

Kuty, David: *See*—
Yokota, Dick; Kuty, David; and Kinter, Malcolm, 4,391,531, Cl. 368-239.000.

Kuwabara, Kouji; Sugawara, Hiroyuki; Shirakura, Toshiharu; Sasaki, Kouji; and Takemori, Satoshi, to Hitachi, Ltd. Axis-monitoring apparatus for a laser beam. 4,391,519, Cl. 356-153.000.

Kyburz, Emilio: *See*—
Imhof, Rene; and Kyburz, Emilio, 4,391,978, Cl. 546-138.000.

Kyowa Hakko Kogyo Co., Ltd.: *See*—
Kimura, Kazuo; Takayama, Kenichiro; Ado, Yutaka; Kawamoto, Tamotsu; and Masunaga, Izumi, 4,391,910, Cl. 435-232.000.

L.G.T. Laboratoire General des Telecommunications: *See*—
Cluniat, Claude, 4,392,252, Cl. 455-116.000.

La Jolla Cancer Research Foundation: *See*—
Engvall, Eva S.; and Ruoslahti, Erkki I., 4,391,749, Cl. 260-123.700.

La Telemecanique Electrique: *See*—
Cadet, Christian; Dumortier, Bernard; and Souques, Georges, 4,392,174, Cl. 361-45.000.

LaBate, Micheal D. Ceramic insert. 4,391,434, Cl. 266-196.000.

Labbe, Donald E.; and Brown, Mayo E., Jr., to General Electric Company. Attemperator-deaerator condenser. 4,391,101, Cl. 60-646.000.

Labeco Harvesters, Inc.: *See*—
Harris, Robert H.; Humphrey, Troy G.; and Stimson, John J., Jr., 4,391,085, Cl. 56-330.000.

Laird, William F.; and Wood, Kenneth A., to Hartford Fibres, Ltd. Cutter with angular blades and method for cutting rope therewith. 4,391,169, Cl. 83-37.000.

Lakin, Willis: *See*—
Lakin, Willis M.; Goodman, Faith L.; and Savoca, Diane L., 4,391,064, Cl. 46-130.000.

Lakin, Willis M.; Goodman, Faith L.; and Savoca, Diane L., to Lakin, Willis. Acrobatic toy. 4,391,064, Cl. 46-130.000.

Lamar, Richard S.; Ferreira, Laurence E.; and Cloud, Robert C., to Standard Oil Company (Indiana). Mineral treatment and composition. 4,391,733, Cl. 252-378.00R.

Lamar, Richard S.: *See*—
Ferreira, Laurence E.; Lamar, Richard S.; and Bertolacini, Ralph J., 4,391,734, Cl. 252-378.00R.

Lance Austin Enterprises, Inc.: *See*—
Grimes, Fred K., 4,391,428, Cl. 248-546.000.

Land, Cecil E.; and Peercy, Paul S., to United States of America, Energy. Photosensitivity enhancement of PLZT ceramics by positive ion implantation. 4,391,901, Cl. 430-495.000.

Landrock, Jurgen B.; Perske, Manfred; and Tandjung, Halim S., to International Business Machines Corporation. Circuit arrangement for the continual operation monitoring and error diagnosis of a stepper motor. 4,392,097, Cl. 318-696.000.

Lange, Karl-Heinz, to Balda-Werke Photographische Gerate und Kunststoff GmbH & Co., KG. Camera with attachable flash device. 4,391,501, Cl. 354-149.000.

Lange, Wolfgang, to Akzo NV. Porose, pulverformige polymerteilchen. 4,391,920, Cl. 521-61.000.

Langenberg, Helmut; Grinebach, Hans-Theodor; and Weinhold, Heinz, to Gewerkschaft Eisenhutte Westfalia. Method of, and apparatus for, winning mineral material. 4,391,470, Cl. 299-11.000.

Langer, Arthur W., Jr., to Exxon Research and Engineering Co. Catalyst for olefinic polymerization. 4,391,738, Cl. 252-429.00B.

Langer, Robert S., Jr.: *See*—
Folkman, Moses J.; and Langer, Robert S., Jr., 4,391,797, Cl. 424-19.000.

Lanier Business Products, Inc.: *See*—
Plunkett, Luther C., Jr., 4,392,218, Cl. 369-29.000.

Lanzillotti, Harry V.: *See*—
Burnett, George H.; Claflin, Warren E.; Lanzillotti, Harry V.; Lilly, A. Clifton, Jr.; Niesow, John F.; Oudese, Thomas S.; and Wayte, Alline R., 4,391,285, Cl. 131-364.000.

Lapointe, Joseph A. Sample splitter. 4,391,359, Cl. 193-23.000.

Larson, William C., to Colt Industries Operating Corp. Pressure operated three-position throttle stop assembly. 4,391,245, Cl. 123-339.000.

Lary, Richard F.: *See*—
Arulpragasam, Jega A.; Giggi, Robert A.; Lary, Richard F.; and Sullivan, Daniel T., 4,392,200, Cl. 364-200.000.

Lasag AG: *See*—
Fankhauser, Franz; van der Zypen, Eugen; and Roussel, Philippe, 4,391,275, Cl. 128-303.100.

Latsch, Reinhard, to Robert Bosch GmbH. Method for closed-loop control of the ignition angle or the composition of the operational mixture furnished an internal combustion engine. 4,391,248, Cl. 123-425.000.

Laughner, Ernest M. Method of filtering electromagnetic waves and dual channel audio code filter therefor. 4,392,233, Cl. 375-93.000.

Laugier, Yves D., to Technal International S.A. Method of assembling two shaped sections with a cotter. 4,391,031, Cl. 29-526.00R.

Laurin, Dean G.: *See*—
Czuba, Leonard F.; and Laurin, Dean G., 4,391,029, Cl. 29-450.000.

Lawson, J. William; and Matthews, Robert M., to Kellwood Company. Panty hose with body bulge control. 4,390,999, Cl. 2-409.000.

Lazarus, Harrison; and Nelson, James A. Peritoneal catheter. 4,391,276, Cl. 604-266.000.

Lecron, Jacques; Manera, Maxime; Faure, Jean-Paul; and Renaudin, Jean-Pierre, to Societe Vetrotex Saint-Gobain. Process and apparatus for the manufacture of fibers. 4,391,618, Cl. 65-1.000.

Lee, Chi-long; and Spells, Sherwood, to Dow Corning Corporation. Microwave cured silicone elastomeric foam. 4,391,765, Cl. 264-26.000.

Lee, Thomas E.: *See*—
Intlekofer, Michael J.; Hanson, Jay R.; and Lee, Thomas E., 4,392,137, Cl. 343-5.0SC.

Leedham, Charles G.: *See*—
Gray, Frederick M.; and Leedham, Charles G., 4,392,121, Cl. 340-310.00A.

Leeman, John: *See*—
Hildebrand, Karl J.; and Leeman, John, 4,391,523, Cl. 356-328.000.

Leeman Labs Inc.: *See*—
Hildebrand, Karl J.; and Leeman, John, 4,391,523, Cl. 356-328.000.

Leesona Corporation: *See*—
Arends, Albert W.; and Henke, Ronald E., 4,391,768, Cl. 264-285.000.

Leffers, Arthur J. Stove apparatus. 4,391,266, Cl. 126-123.000.

Le Foll, Jean; and Benaroya, Henry. Apparatus for the selective skimming of a light liquid layer on a body of water. 4,391,708, Cl. 210-242.300.

Lehmann, Li K.: *See*—
Campbell, Jay E.; Reichmann, Richard H.; and Lehmann, Li K., 4,391,402, Cl. 227-121.000.

Lehtinen, Antti, to Valmet Oy. Method used in paper making for treatment of a weave. 4,391,672, Cl. 162-192.000.

Leigh, Thomas, to Imperial Chemical Industries PLC. Carboxamidoesters. 4,391,983, Cl. 560-124.000.

LeLasso Corporation: *See*—
Finnegan, Charles C., 4,391,376, Cl. 211-60.0SK.

Lemoine, Maurice G.; and Pasdera, Leonard A., to Ampex Corporation. Method and apparatus for digital video signal processing. 4,392,159, Cl. 358-319.000.

Le Page, Jean-Francois; and Martino, Germain, to Institut Francais du Petrole. Process for upgrading heavy oils. 4,391,701, Cl. 208-370.000.

Le Page, Jean-Francois: *See*—
Billon, Alain; Le Page, Jean-Francois; Peries, Jean-Pierre; and Simandoux, Jean-Claude, 4,391,700, Cl. 208-86.000.
Cosyns, Jean; Juguin, Bernard; Le Page, Jean-Francois; and Miquel, Jean, 4,392,002, Cl. 585-329.000.

Lepisto, J. George, to Champion International Corporation. Bag filler spout. 4,391,310, Cl. 141-286.000.

Lequien, Jean, to CII Honeywell Bull. Method of and apparatus for controlling the gain of circuitry responsive to read head of a memory. 4,392,164, Cl. 360-77.000.

Lerot, Luc: *See*—
Hardy, Nicolas; Lerot, Luc; and Walraevens, Rene, 4,391,753, Cl. 549-525.000.

Lersmacher, Bernhard; and Lydtin, Hans, to U.S. Philips Corporation. Rotary anode for an X-ray tube and method of manufacturing such an anode. 4,392,238, Cl. 378-144.000.

Lesher, George Y.; Opalka, Chester J., Jr.; and Page, Donald F., to Sterling Drug Inc. 2-Amino-6-(pyridinyl)-3H-imidazo[4,5-b]pyridines and their cardiotonic use. 4,391,811, Cl. 424-263.000.

Lesley, David J.; and Davis, Lawrence C., Jr., to ABCO Industries, Inc. Dry textile warp size composition. 4,391,934, Cl. 524-43.000.

Lester, James N.; and Prager, Lee A., to GTE Products Corporation. Isolator for use with frequency responsive switching circuit. 4,392,089, Cl. 315-313.000.

Levercom, Warren. Log splitting device. 4,391,311, Cl. 144-193.00D.

Levi, George W.; and Kanyo, Kalman, to G&D, Inc. Wire straightening and cutting mechanism. 4,391,307, Cl. 140-140.000.

Levis, William W., Jr.: *See*—
Korczak, Alexander; and Levis, William W., Jr., 4,391,728, Cl. 252-182.000.

Levitt, George, to Du Pont de Nemours, E. I., and Company. Herbicidal benzothiophene and benzofuran sulfonamides. 4,391,627, Cl. 71-90.000.

Levy, David. Gaming apparatus. 4,391,442, Cl. 273-142.00E.

Lew, Hyok S. Angular position belt valve pump. 4,391,572, Cl. 418-45.000.

Lewis, Frederick M., to Sterling Drug, Inc. Method for controlling temperatures in the afterburner and combustion hearths of a multiple hearth furnace. 4,391,208, Cl. 110-346.000.

Lewis, James C.; Miller, Jerry W.; Simpson, Clyde D.; and Thomasson, Ronald G., to Automation Industries, Inc. Dielectric test unit. 4,392,104, Cl. 324-54.000.

Lewis, John, Jr.: *See*—
Brassell, Gilbert W.; and Lewis, John, Jr., 4,391,873, Cl. 428-297.000.

Liang, Charles C.; Bolster, M. Elizabeth; and Murphy, Robert M., to Wilson Greatbatch Ltd. Metal oxide composite cathode material for high energy density batteries. 4,391,729, Cl. 252-182.100.

Libbey-Owens-Ford Company: *See*—
Daman, Lloyd W.; and Shamp, Donald E., 4,391,581, Cl. 431-160.000.

Libman, Philomena C., to Zenith Radio Corporation. Deeply filtered television image display. 4,392,077, Cl. 313-474.000.

Licentia Patent-Verwaltungs-GmbH: *See*—
Albrecht, Werner; Fischer, Klaus; and Grun, Gerhard, 4,392,136, Cl. 340-825.560.

Lichtenstein, Joseph: *See*—
Sharpless, Edward N.; Gordon, Marvin; and Lichtenstein, Joseph, 4,391,283, Cl. 128-725.000.

Liefkens, Adrianus C. H. J.: *See*—
Boullart, Carolus J.; and Liefkens, Adrianus C. H. J., 4,392,169, Cl. 360-130.330.

Lilly, A. Clifton, Jr.: *See*—
Burnett, George H.; Claflin, Warren E.; Lanzillotti, Harry V.; Lilly, A. Clifton, Jr.; Nienow, John F.; Osdene, Thomas S.; and Wayte, Alline R., 4,391,285, Cl. 131-364.000.

Lim, Franklin, to Damon Corporation. Microcapsules containing viable tissue cells. 4,391,909, Cl. 435-178.000.

Lin, Ching-Yu; and Hickam, William M., to Westinghouse Electric Corp. Apparatus for monitoring $SO_2$ concentrations. 4,391,690, Cl. 204-412.000.

Lin, Chung-Yuan, to Upjohn Company, The. Phthalic anhydride derivatives. 4,391,751, Cl. 260-239.30R.

Linder, Ernst; Maurer, Helmut; Muller, Klaus; and Rieger, Franz, to Robert Bosch GmbH. Temperature compensated polarographic oxygen gas sensor and sensing system, particularly for automotive application. 4,391,691, Cl. 204-408.000.

Lindmayer, Joseph, to Solarex Corporation. Photovoltaic cells having contacts and method of applying same. 4,392,010, Cl. 136-256.000.

Lindquist, Herman A., to Voest-Alpine Aktiengesellschaft. Turbine installation comprising a turbine installed in a duct. 4,392,063, Cl. 290-54.000.

Liofilizaciones Esterilizaciones Y Sinthesis S.A.: *See*—
Ciriza, Santiago A.; and Padro, Carlos E. L., 4,391,974, Cl. 544-030.000.

List, Hans: *See*—
Greier, Josef; and Pomfret, Colin T., 4,391,238, Cl. 123-193.00C.
Krempl, Peter W.; Claassen, Peter; and Zeiringer, Rudolf, 4,391,147, Cl. 73-730.000.

Litman, David J.; and Ullman, Edwin F., to Syva Company. Test strip kits in immunoassays and compositions therein. 4,391,904, Cl. 435-7.000.

Litton Systems, Inc.: *See*—
Hostetler, James W., 4,392,229, Cl. 372-94.000.

Lloyd, Herbert W., to Abex Corporation. Sintered powder metal friction material. 4,391,641, Cl. 106-36.000.

Lobl, Herbert: *See*—
Hinz, Hans D.; and Lobl, Herbert, 4,392,194, Cl. 346-154.000.

Lockheed Corporation: *See*—
Bruensicke, Wilhelm A., 4,391,017, Cl. 15-313.000.

Loeffler, William R.: *See*—
Tibbals, Edward C., Jr., 4,391,156, Cl. 74-336.500.

Lonati, Francesco, to Costruzioni Meccaniche Lonati S.p.A. Yarn feed unit in a single-cylinder circular knitting machine. 4,391,105, Cl. 66-138.000.

Lonnstedt, Bo G. Ear muff mounting device. 4,391,000, Cl. 2-423.000.

Lonza Ltd.: *See*—
Huwiler, Alfred; and Tenud, Leander, 4,391,979, Cl. 548-194.000.

Lopatina, Alla V.: *See*—
Bykhovsky, David G.; Voropaev, Albert A.; Olennikov, Evgeny F.; and Lopatina, Alla V., 4,392,047, Cl. 219-145.210.

Lorang, Marcel: *See*—
Bloise, Rene; Lorang, Marcel; Morizot, Georges; and Boissonnade, Genevieve, 4,391,792, Cl. 423-617.000.

Lord Corporation: *See*—
Hannibal, Alan J.; and Parr, Charles H., 4,391,594, Cl. 464-80.000.
Miller, Henry C.; and Howard, Dennis D., 4,391,686, Cl. 204-159.150.

L'Oreal: *See*—
Rosenbaum, Georges; Grollier, Jean F.; and Cotteret, Jean, 4,391,603, Cl. 8-424.000.

Loreal, Guy, to Societe Navale Chargeurs Delmas-Vieljeux. Anti-theft locking device adaptable to containers. 4,391,462, Cl. 292-207.000.

Lorenz, Hellmut, to Barmag Barmer Maschinenfabrik AG. False twisting apparatus and method. 4,391,091, Cl. 57-340.000.

Lorenz, Peter; and Schwaier, Anita, to Battelle-Institut e.V. Hepatitis B testing and growth in tree shrew as animal model. 4,391,796, Cl. 424-9.000.

Loughead, Tomas E.: *See*—
Pruett, Edwin C.; Robertson, Kem B.; and Loughead, Tomas E., 4,391,423, Cl. 244-161.000.

Loyola, Luis A. Combination buckle and waist alarm. 4,392,126, Cl. 340-573.000.

Loyzim, Robert J.: *See*—
Grajewski, John P.; and Loyzim, Robert J., 4,392,096, Cl. 318-625.000.

Lu, Chin H., to Xerox Corporation. Developer compositions containing alkyl pyridinium toluene sulfonates. 4,391,890, Cl. 430-110.000.

Lu, Sun; and Chung, David B., to Minnesota Mining and Manufacturing Company. Thermally addressed cholesteric-smectic liquid crystal device. 4,391,492, Cl. 350-351.000.

Luce, John B.: *See*—
Bialous, Charles A.; Luce, John B.; and Mark, Victor, 4,391,935, Cl. 524-82.000.

Luke, Louis E.: *See*—
Runnels, Robert W.; Wagenaar, Loren B.; Luke, Louis E.; and Bresnahan, Thomas P., 4,392,015, Cl. 174-143.000.

Lummus Company, The: *See*—
Tsao, Utah, 4,391,880, Cl. 423-659.000.

Lundgren, Sten T. Electronic lock with changeable opening code. 4,392,133, Cl. 340-825.310.

Lundin, Bertil: *See*—
Vangbo, Hakan; Lundin, Bertil; and Moklint, Oivind, 4,391,667, Cl. 156-205.000.

Lundmark, Larry D., to Henkel Corporation. Phytosterol blends. 4,391,732, Cl. 252-356.000.

Lundstrom, Jan-Erik; and Rudgard, Ingemar, to ASEA Aktiebolag. Method and device for presentation of graphical information. 4,392,130, Cl. 340-747.000.

Lutz, Dieter, to Sachs- Systemtechnik GmbH. Elastic sole for a shoe incorporating a spring member. 4,391,048, Cl. 36-28.000.

Lutz, Dieter, to Sach-Systemtechnik GmbH. Locking device with programmable key. 4,392,134, Cl. 340-825.310.

Luz, David W.: *See*—
Rinehart, James K.; Willis, Donald H.; and Luz, David W., 4,392,090, Cl. 315-411.000.

Lybrand, William, to Bengal, Inc. Anti-static material and method of making the material. 4,391,952, Cl. 525-333.700.

Lydtin, Hans: *See*—
Lersmacher, Bernhard; and Lydtin, Hans, 4,392,238, Cl. 378-144.000.

Lyle Development, Inc.: *See*—
Wendt, Michael, 4,391,171, Cl. 83-82.000.

Lynn, Malcolm; and May, Peter E., to BP Chemicals Limited. Sieve plates and distillation columns. 4,391,675, Cl. 202-158.000.

Lyon, Robert C., to BICC Public Limited Company. Screw fixing. 4,391,546, Cl. 403-189.000.

Lyons, John E.: *See*—
Rotolico, Anthony J.; Romero, Eduardo; and Lyons, John E., 4,391,860, Cl. 427-423.000.

Lytle, Farrel W.: *See*—
Sandstrom, Donald R.; and Lytle, Farrel W., 4,392,236, Cl. 378-045.000.

Mabuchi, Minoru; Sakai, Kiyoshi; Ishikawa, Shozo; Egashira, Yuji; and Kitahara, Makoto, to Canon Kabushiki Kaisha. Electrophotographic photosensitive member with benzimidazole ring containing hydrazones. 4,391,889, Cl. 430-59.000.

Machetel, Roger: *See*—
Planteline, Pierre; and Machetel, Roger, 4,391,251, Cl. 123-440.000.

MacLeod, Colin J.: *See*—
Slattery, William; Brechany, Thomas; and MacLeod, Colin J., 4,391,115, Cl. 72-131.000.

Maeda, Umio; Shoji, Hirofumi; Wada, Yasusuke; and Horie, Yoshio, to Nippon Soda Company Limited. Composition for depositing metallic oxide film coatings. 4,391,743, Cl. 252-518.000.

Maehara, Kenso: *See*—
Ishii, Koji; Shinmoto, Takahiko; and Maehara, Kenso, 4,391,193, Cl. 101-415.100.

Magid, Sidney H. Inflatable articles. 4,391,062, Cl. 46-88.000.

Magnetic Peripherals Inc.: *See*—
Elsing, John W., 4,391,543, Cl. 403-24.000.

Magnusson, Bengt; and Gurtler, Hans, to Bulten-Kanthal AB. Device for carrying electrical resistance elements. 4,392,052, Cl. 219-532.000.

Magnusson, Stig: *See*—
Simmons, Nathaniel; Magnusson, Stig; Puccini, Sergio E.; McLaughlin, Donald W.; and Stelte, David J., 4,392,223, Cl. 370-63.000.

Magori, Valentin: *See*—
Kleinschmidt, Peter; and Magori, Valentin, 4,392,074, Cl. 310-327.000.

Mahmood, Mahmood N.: *See*—
Anderson, Susan; Brown, David E.; Graham, David E.; Mahmood, Mahmood N.; and Man, Maurice C. M., 4,391,681, Cl. 204-99.000.

Maier, Jakob: *See*—
Hoefelmayr, Tilman; and Maier, Jakob, 4,391,221, Cl. 119-14.080.

Maier, Ludwig; and Durr, Dieter, to Ciba-Geigy Corporation. Herbicidally active 2-substituted 5-phenoxyphenylphosphonic acid esters. 4,391,624, Cl. 71-86.000.

Maier, Thomas O.; and Richards, Jack L., to Eastman Kodak Company. Mixture of nondiffusible redox dye-releasers for curve shape control. 4,391,896, Cl. 430-223.000.

Majkrzak, David S. Vehicle exhaust gas warm-up heater system. 4,391,235, Cl. 123-142.50R.

Makabe, Hachiro: *See*—
Tamiya, Yoshimichi; Eguchi, Yasukata; and Makabe, Hachiro, 4,391,212, Cl. 112-158.00E.

Maki, Seiichi: *See*—
Horikawa, Takahiro; Hibino, Yutaka; and Maki, Seiichi, 4,391,218, Cl. 118-621.000.

Makizuka, Takakazu; and Katoh, Sunao, to Sharp Kabushiki Kaisha. Electronic data control in a numbering machine. 4,392,205, Cl. 364-518.000.

Malish, Terrance J. Coupling device for floor maintenance machines. 4,391,548, Cl. 403-348.000.

Malmohus Invest AB: *See*—
Edstrom, Lars G., 4,391,439, Cl. 271-90.000.

Malmstrom, Rolf E.: *See*—
Aaltonen, Olavi A.; Malmstrom, Rolf E.; Nermes, Esko O.; and Tuominen, Tapio K., 4,391,632, Cl. 75-26.000.

Malott, Theodore A.; and Wolfe, Robert W., to Clark Equipment Company. Biased transmission control shaft. 4,391,158, Cl. 74-473.00R.

Man, Maurice C. M.: *See*—
Anderson, Susan; Brown, David E.; Graham, David E.; Mahmood, Mahmood N.; and Man, Maurice C. M., 4,391,681, Cl. 204-99.000.

Manaka, Tetsuyuki: *See*—
Ohhashi, Shiro; Ubusawa, Fumiyoshi; Iwasaki, Shoji; and Manaka, Tetsuyuki, 4,392,243, Cl. 455-74.000.

Manera, Maxime: *See*—
Lecron, Jacques; Manera, Maxime; Faure, Jean-Paul; and Renaudin, Jean-Pierre, 4,391,618, Cl. 65-1.000.

Mani, Krishnamurthy; and Chlanda, Frederick P., to Allied Corporation. Preparing alkali metal hydroxide by water splitting and hydrolysis. 4,391,680, Cl. 204-98.000.

Manitowoc Company, Inc., The: *See*—
Morrow, James G., Sr., 4,391,477, Cl. 308-221.000.

Mannesmann Aktiengesellschaft: *See*—
Mindt, Walter, 4,391,692, Cl. 204-206.000.

Marathon Equipment Company: *See*—
Gwathney, Kenneth W.; Gann, David L.; Seagraves, Steven G., Sr.; Fenner, Gary R.; and Fenner, Gordon H., 4,391,188, Cl. 100-229.00A.

Marcellis, Alphonso W.; and Johnson, Grannis S., to Diamond Shamrock Corporation. Additives for cementitious materials. 4,391,645, Cl. 106-90.000.

Marchal, Jean: *See*—
Barkats, Gerard; Girard, Alain; Marchal, Jean; and Morel, Charles, 4,392,007, Cl. 136-248.000.

Marcy, Russell A., to Waterbury Companies, Inc. Latching mechanism for dispenser apparatus. 4,391,111, Cl. 70-162.000.

Mardis, Wilbur S.; and Finlayson, Claude M., to NL Industries, Inc. Rheological additive for non-aqueous fluid systems. 4,391,637, Cl. 106-20.000.

Mariani, Luigi; and Tarzia, Giorgio, to Gruppo Lepetit S.p.A. Pyrrolodiazepine derivatives and their pharmaceutical compositions. 4,391,817, Cl. 424-274.000.

Marini, Jean; and Audenard, Bernard, to Framatome. Sound-monitoring device for an industrial installation. 4,392,214, Cl. 367-127.000.

Mark, Victor: *See*—
Bialous, Charles A.; Luce, John B.; and Mark, Victor, 4,391,935, Cl. 524-82.000.

Marnach, Ernest: *See*—
Kneip, Fernand; and Marnach, Ernest, 4,392,176, Cl. 361-160.000.

Marom, Emanuel: *See*—
Konforti, Naim; and Marom, Emanuel, 4,392,155, Cl. 358-106.000.

Marsh, Douglas D.; Feldman, Arthur E.; and Newlin, John C. Utility cart with detachable and reversible shelves. 4,391,454, Cl. 280-47.350.

Martens, Jurgen: *See*—
Spindler, Manfred; Tanner, Herbert; Geiger, Friedhelm; Bittner, Friedrich; and Martens, Jurgen, 4,391,987, Cl. 562-559.000.
Spindler, Manfred; Tanner, Herbert; Geiger, Friedhelm; Bittner, Friedrich; and Martens, Jurgen, 4,391,988, Cl. 562-559.000.

Marti, Ernst, to Karl Kassbohrer Fahrzeugwerke GmbH. Water-closet for vehicles, particularly motor coaches. 4,391,002, Cl. 4-321.000.

Martin, Graham E., to Imperial Chemical Industries PLC. Process for spinning amino-formaldehyde fibers. 4,391,770, Cl. 264-236.000.

Martin, Wayne A., to United States Steel Corporation. Mechanism for forming a hole through a forged workpiece. 4,391,118, Cl. 72-356.000.

Martini, Leonard J. Thrust shaft seal with slidably mounted bearing sleeve. 4,391,474, Cl. 384-152.000.

Martino, Germain: *See*—
Le Page, Jean-Francois; and Martino, Germain, 4,391,701, Cl. 208-370.000.

Maruhashi, Shigeaki: *See*—
Yamauchi, Takashi; Maruhashi, Shigeaki; and Hasegawa, Morihiro, 4,391,633, Cl. 75-53.000.

Maruta, Rikio, to Nippon Electric Co., Ltd. PCM Signal interface apparatus. 4,392,234, Cl. 375-118.000.

Maruyama, Teruo; Ichiyanagi, Takashi; and Otoda, Ichizo, to Matsushita Electric Industrial Co., Ltd. Rotary head assembly. 4,392,168, Cl. 360-129.000.

Masamoto, Junzo; Hamada, Minoru; Suzuki, Isamu; and Yoshida, Takeo, to Asahi Kasei Kogyo Kabushiki Kaisha. Polyoxymethylene composition. 4,391,741, Cl. 252-511.000.

Maschke, Alfred W., to United States of America, Energy. Means and method for the focusing and acceleration of parallel beams of charged particles. 4,392,080, Cl. 315-5.410.

Mashio, Fujio; and Kitamura, Shuji, to Mitsi Toatsu Inorganic Chemicals, Inc. Chelate resin prepared by reacting butane-1,2,3,4-tetra-carboxylic acid or anhydride with polyethylene polyamine. 4,391,945, Cl. 524-600.000.

Mashio, Sakae, to Tama Manufacturing Co., Limited. Control device for auxiliary members of a vehicle. 4,391,242, Cl. 123-198.00R.

Mason, Arthur D., Jr.; Johnson, Avery A., Jr.; and Ritchey, Charles R., to United States of America, Army. Protective gel composition for treating white phosphorus burn wounds. 4,391,799, Cl. 424-132.000.

Masotti, Maurizio; Zentile, Antonio; and Cau, Pasqualino, to Montedison S.p.A. Bumper for motorvehicles and the like, made of plastic materials, and having its cross section closed by a rear reinforcing part. 4,391,464, Cl. 293-120.000.

Massey, Freddie L.; and Callander, Douglas D., to Goodyear Tire & Rubber Company, The. Color improvement and acetaldehyde reduction in high molecular weight polyesters. 4,391,971, Cl. 528-481.000.

Mast, Aquila D.: *See*—
Young, Terry A.; and Mast, Aquila D., 4,391,364, Cl. 198-865.000.

Master Addresser Company: *See*—
Rogers, Ronald A.; Wright, Ansel J.; and Wright, William H., 4,391,194, Cl. 101-471.000.

Masuda, Isao: *See*—
Nakagawa, Kenji; and Masuda, Isao, 4,391,916, Cl. 501-62.000.

Masunaga, Izumi: *See*—
Kimura, Kazuo; Takayama, Kenichiro; Ado, Yutaka; Kawamoto, Tamotsu; and Masunaga, Izumi, 4,391,910, Cl. 435-232.000.

Mathauser, William R. Hand operated hydraulic bicycle brake. 4,391,353, Cl. 188-24.120.

Mathes, Donovan B.; Hamilton, Floyd B.; and Spreng, Douglas C., to Solar Dynamics Inc. Solar water heater control and protection system. 4,391,268, Cl. 126-437.000.

Mathieson, Ernest; Smith, Graham C.; and Gilvin, Philip J., to National Research Development Corporation. Position-sensitive radiation detector. 4,392,057, Cl. 250-385.000.

Matsuda, Fumihiko: *See*—
Shimizu, Hiroshi; Sakai, Sigeo; Matsuda, Fumihiko; and Matsumoto, Reiko, 4,391,649, Cl. 127-46.200.

Matsuda, Toshiro, to Nissan Motor Company, Limited. Method and apparatus for anti-skid brake control of an automotive vehicle. 4,392,202, Cl. 364-426.000.

Matsui, Fujio, to Fuji Jukogyo Kabushiki Kaisha; and Nissan Motor Co., Ltd. System for detecting the operation of the throttle valve. 4,391,250, Cl. 123-438.000.

Matsui, Hiroshi; Tsuchida, Takayasu; and Nakamori, Shigeru, to Ajinomoto Company Incorporated. Method for producing L-valine by fermentation. 4,391,907, Cl. 435-115.000.

Matsui, Takahiro, to Kabushiki Kaisha Morita Seisakusho. Dental treatment chair. 4,391,588, Cl. 433-33.000.

Matsumoto, Joji: *See*—
Kamezaki, Yasushi; Inoue, Eiichi; Nishihama, Hitoshi; Fushida, Akira; and Matsumoto, Joji, 4,391,892, Cl. 430-126.000.

Matsumoto, Jun: *See*—
Mori, Hiromichi; Matsumoto, Jun; and Fujioka, Masanobu, 4,392,224, Cl. 370-67.000.

Matsumoto, Masataka: *See*—
Matsumura, Osamu; and Matsumoto, Masataka, 4,391,534, Cl. 368-294.000.

Matsumoto, Reiko: *See*—
Shimizu, Hiroshi; Sakai, Sigeo; Matsuda, Fumihiko; and Matsumoto, Reiko, 4,391,649, Cl. 127-46.200.

Matsumura, Osamu; and Matsumoto, Masataka, to Citizen Watch Co., Ltd. Glass mounting structure for watches. 4,391,534, Cl. 368-294.000.

Matsuo, Yushin: *See*—
Wakabayashi, Takuo, deceased; Wakabayashi, Shigemasa, legal representative; Tahara, Iwao; Aihara, Toshiharu; Takahashi, Naoki; and Matsuo, Yushin, 4,391,530, Cl. 368-63.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Hamane, Tokuhito; Kinoshita, Toshio; Kihira, Masafumi; Hamada, Hitosi; and Gotou, Mikio, 4,391,306, Cl. 140-92.100.
Ishikawa, Shinzaburo; Kanai, Kenji; Kaminaka, Nobuyuki; and Adachi, Tetuo, 4,392,166, Cl. 360-113.000.
Itoh, Kunio; Sugino, Takashi; Wada, Masaru; and Shimizu, Hirokazu, 4,392,227, Cl. 372-46.000.
Maruyama, Teruo; Ichiyanagi, Takashi; and Otoda, Ichizo, 4,392,168, Cl. 360-129.000.
Okabe, Takako; Itoh, Kunio; and Sugino, Takashi, 4,392,228, Cl. 372-46.000.
Saruwatari, Shigeto, 4,391,882, Cl. 429-96.000.
Shimazaki, Shigeo, 4,392,198, Cl. 364-200.000.

Matsushita Electronics Corp.: *See*—
Horii, Kenju, 4,392,154, Cl. 358-44.000.

Matsuura, Shigeo; and Yuki, Ikuo, to Hitachi, Ltd. Electronic channel selection apparatus with surface acoustic wave device. 4,392,249, Cl. 455-164.000.

Matteini, Silvano. Tubular rotary furnace for incinerating refuse and the like, with inner demountable grid. 4,391,206, Cl. 110-246.000.

Matthews, Robert M.: *See*—
Lawson, J. William; and Matthews, Robert M., 4,390,999, Cl. 2-409.000.

Maurer, Helmut: *See*—
Linder, Ernst; Maurer, Helmut; Muller, Klaus; and Rieger, Franz, 4,391,691, Cl. 204-408.000.

Maurer, Herman J.: *See*—
Smith, Wayne G.; and Maurer, Herman J., 4,391,050, Cl. 37-142.00A.

Maurice, Terrence J.: *See*—
Grealy, Jennifer M.; and Maurice, Terrence J., 4,391,750, Cl. 260-123.500.

Mauthe, Peter, to Hilti Aktiengesellschaft. Method of and means for providing an effective thermoplastic adhesive connection or seal using thermochrome dye. 4,391,662, Cl. 156-64.000.

Mautz, Gus H., Jr.: *See*—
Velmin, Rolf; Kovatch, Michael S.; and Mautz, Gus H., Jr., 4,391,674, Cl. 201-41.000.

Maxey, Frank S., deceased (by Maxey, Gertrude, legal representative); and Mowdood, Syed K., to Goodyear Tire & Rubber Company, The. Composite of rubber and metal reinforcement therefor. 4,391,318, Cl. 152-359.000.

Maxey, Gertrude, legal representative: *See*—
Maxey, Frank S., deceased; and Mowdood, Syed K., 4,391,318, Cl. 152-359.000.

Maximov, July S. Device for tightening coarse thread connections. 4,391,431, Cl. 254-29.00A.

Maxwell, Jerrold F.: *See*—
Schwartz, Ellen S.; Tincher, Cline A.; and Maxwell, Jerrold F., 4,391,722, Cl. 252-73.000.

Maxwell Laboratories, Inc.: *See*—
Rostoker, Norman, 4,392,111, Cl. 328-237.000.

May, Peter E.: *See*—
Lynn, Malcolm; and May, Peter E., 4,391,675, Cl. 202-158.000.

Mayer, Franz: *See*—
Kuhls, Jurgen; Mayer, Franz; and Fitz, Herbert, 4,391,940, Cl. 524-458.000.

Mazurkewitz, Anthony R., to Austin Company, The. Image display system. 4,391,495, Cl. 350-452.000.

McBee, William C.; and Sullivan, Thomas A., to United States of America, Commerce. Modified sulfur cement. 4,391,969, Cl. 528-389.000.

McCain, G. Howard: *See*—
Baczek, Stanley K.; McCain, G. Howard; Benezra, Leo L.; and Covitch, Michael J., 4,391,844, Cl. 427-44.000.

McCarthy, Harold J., Jr., to Goodyear Tire & Rubber Company, The. Lamination of polyvinyl chloride cast films. 4,391,868, Cl. 428-215.000.

McCurry, H. Michael, to American Filtrona Corporation. Preferential wicking system. 4,391,716, Cl. 210-799.000.

McDonald, Colin. Weight balanced spool carrier. 4,391,422, Cl. 242-129.600.

McGraw-Edison Company: *See*—
Urani, Angelo, 4,391,485, Cl. 339-191.00S.

McGuiness, Robert C.: *See*—
Falkenburg, Hans R.; Krause, Siegfried; and McGuiness, Robert C., 4,391,965, Cl. 528-112.000.

McHale, Angelika H.: *See*—
Falender, James R.; and McHale, Angelika H., 4,391,937, Cl. 524-119.000.

McIntyre, Donald B.; and McIntyre, Frederic S., to Acumeter Laboratories, Inc. Adhesive applicator and method for cigarette-to-filter adhesion and similar applications. 4,391,856, Cl. 427-358.000.

McIntyre, Frederic S.: *See*—
McIntyre, Donald B.; and McIntyre, Frederic S., 4,391,856, Cl. 427-358.000.

McLaughlin, Donald W.: *See*—
Simmons, Nathaniel; Magnusson, Stig; Puccini, Sergio E.; McLaughlin, Donald W.; and Stelte, David J., 4,392,223, Cl. 370-63.000.

McLaughlin, Joseph L., to Itek Corporation. Interferometric surface contour measuring arrangement. 4,391,526, Cl. 356-359.000.

McLaughlin, Michael H.: *See*—
Glascock, Homer H., II; Houston, Douglas E.; McLaughlin, Michael H.; and Webster, Harold F., 4,392,153, Cl. 357-82.000.

McLeod, Mark H., to International Business Machines Corp. Test circuit for delay measurements on a LSI chip. 4,392,105, Cl. 324-57.0DE.

McWhorter, Thomas E., to Air Products and Chemicals, Inc. Back-diffusion quality control method for barrier treated containers. 4,391,128, Cl. 73-38.000.

Mead Corporation, The: *See*—
Brody, Aaron L.; Embro, Joseph J.; and Young, William E., 4,391,080, Cl. 53-426.000.

Medalia, Avrom I.: *See*—
Cotten, George R.; and Medalia, Avrom I., 4,391,941, Cl. 524-495.000.

Medel, Louis W., Jr.; and Barak, Yoram, to Noga, Helen H., a part interest. Rotary positive displacement mechanism. 4,391,574, Cl. 418-195.000.

Meden-Piesslinger, Gertraud A. A.; and Van de Heuvel, Johannes H. P., to U.S. Philips Corporation. Precision pressed optical components made of glass and glass suitable therefor. 4,391,915, Cl. 501-48.000.

Medtronic, Inc.: *See*—
Cahalan, Patrick T.; and Coury, Arthur J., 4,391,278, Cl. 128-640.000.

Mehaffey, Joseph H.; and Szlam, Aleksander, to Solid State Systems, Inc. Multiplexed liquid crystal display. 4,392,129, Cl. 340-765.000.

Mehdorn, Frank R.; and Seelig, Johann, to Hoechst Aktiengesellschaft. Process for laying down continuous material. 4,391,025, Cl. 28-289.000.

Meiers, Gerald F.: *See*—
Koning, Richard W.; Meiers, Gerald F.; and Anstey, Henry D., 4,391,187, Cl. 100-88.000.

Meister, John J., to Phillips Petroleum Company. Ethoxylated sulfosuccinate additives for stabilizing solutions of petroleum sulfonates in hard brine. 4,391,719, Cl. 252-8.55D.

Melman, Paul; and Carlsen, W. John, to GTE Laboratories Incorporated. Optical fiber centering device. 4,391,487, Cl. 350-96.200.

Melrose, Denis G.: *See*—
Schild, Rolf; Melrose, Denis G.; and Hawkins, Brian M., 4,391,009, Cl. 5-453.000.

Melvin, Lawrence S., Jr.: *See*—
Harbert, Charles A.; Johnson, Michael R.; and Melvin, Lawrence S., Jr., 4,391,827, Cl. 424-331.000.

Memon, Nazir A.; and Myers, Cielo S., to Rohm and Haas Company. Polyethylene terephthalate compositions having improved crystallization rate and surface appearance. 4,391,938, Cl. 524-270.000.

Memorex Corporation: *See*—
Bischoff, Peter G., 4,391,849, Cl. 427-129.000.

Mendiratta, Ashok K., to General Electric Company. Ion exchange catalyzed bisphenol process. 4,391,997, Cl. 568-727.000.

Merani, Gianfranco; and Anzuino, Giuseppe, to Montedison S.p.A. Process for preparing polyamides having a modified dye affinity. 4,391,968, Cl. 528-321.000.

Mercantile & Technical Promotions Inc.: *See*—
Chiquiar-Arias, Marcelo, 4,391,273, Cl. 604-110.000.

Merck & Co., Inc.: *See*—
Durette, Philippe L.; and Shen, Tsung-Ying, 4,391,800, Cl. 424-177.000.

Dybas, Richard A.; Grier, Nathaniel; and Witzel, Bruce E., 4,391,812, Cl. 424-267.000.

Merges, Heinz: *See—*
Janssens, Wilhelmus G. E.; and Merges, Heinz, 4,391,047, Cl. 34-97.000.

Merrell Dow Pharmaceuticals Inc.: *See—*
Harrison, Boyd L.; and Doherty, Niall S., 4,391,818, Cl. 424-277.000.

Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung: *See—*
Bock, Thomas-Mathias, 4,392,027, Cl. 179-181.00W.

Messerschmitt-Bolkow-Blohm Gesellschaft mit Beschrankter Haftung: *See—*
Engel, Herbert; and Boettger, Horst, 4,391,094, Cl. 60-245.000.

Metallgesellschaft Aktiengesellschaft: *See—*
Serbent, Harry; Schlebusch, Detlev; Reuter, Gerhard; and Schnabel, Wolfram, 4,391,583, Cl. 432-4.000.

Metaport Corporation: *See—*
Zummer, Anthony S., 4,391,545, Cl. 403-189.000.

Metzler, Hans-Georg, to Siemens Aktiengesellschaft. Pre-setting of printing machines. 4,391,190, Cl. 101-211.000.

Meyer, Armin; and Boragine, Carlo, to Ciba-Geigy AG. Process for the production of a photographic color image by the silver dye bleach process and suitable color photographic material therefor. 4,391,884, Cl. 430-17.000.

Michael, David J.; and Wishon, Berhl E., to Dresser Industries, Inc. Alumino-silicate refractory brick. 4,391,917, Cl. 501-100.000.

Midway Fishing Tool Co.: *See—*
Reed, Lehman T., 4,391,324, Cl. 166-70.000.

Milanowski, G. Jan: *See—*
Drost, Cornelis J.; and Milanowski, G. Jan, 4,391,124, Cl. 73-1.0DV.

Miles Laboratories, Inc.: *See—*
Bauer, Robert, 4,391,905, Cl. 435-14.000.
Bauer, Robert, 4,391,906, Cl. 435-14.000.

Millar, Frederick W. Security apparatus. 4,391,203, Cl. 109-25.000.

Millar, Robert W., to Orshansky Transmission Corporation. Fast-response three-way solenoid valve. 4,391,292, Cl. 137-269.000.

Miller, Donald M., to Battelle Memorial Institute. Hydraulic servo control spool valve. 4,391,430, Cl. 251-205.000.

Miller, Henry C.; and Howard, Dennis D., to Lord Corporation. Actinic radiation curable formulations. 4,391,686, Cl. 204-159.150.

Miller, Jerry W.: *See—*
Lewis, James C.; Miller, Jerry W.; Simpson, Clyde D.; and Thomasson, Ronald G., 4,392,104, Cl. 324-54.000.

Miller, Roscoe E. Enema apparats improvements relating to double contrast studies. 4,391,280, Cl. 128-654.000.

Miller, Toby I.: *See—*
Kolb, Arthur F.; Franklin, Arthur J.; and Miller, Toby I., 4,392,118, Cl. 337-154.000.

Milliken Research Corporation: *See—*
Rogers, Jack S.; and Sanders, Kenneth H., 4,391,871, Cl. 428-219.000.

Mills, Jack; Schmiegel, Klaus K.; and Shaw, Walter N., to Eli Lilly and Company. Phenethanolamines, compositions containing the same, and method for effecting weight control. 4,391,826, Cl. 424-324.000.

Min, Young K., to PT Components, Inc. RPM Sensor for electronic motor braking. 4,392,098, Cl. 318-758.000.

Mina, Nabil L., to Appleton Electric Company. Electrical terminal. 4,391,480, Cl. 339-32.00R.

Minato, Ichiro; Shibata, Koichi; and Fujinami, Kimiya, to Takeda Chemical Industries, Ltd. Aldimines and ketimines of 1,3,5-(aminomethyl)benzene or cyclohexane and their use as curing agents for epoxy and poylurethane resins. 4,391,958, Cl. 525-504.000.

Mindt, Walter, to Mannesmann Aktiengesellschaft. Device for the chemical or electrochemical surface treatment or material in a heated liquid treatment medium, more particularly a strip pickling plant. 4,391,692, Cl. 204-206.000.

Minemura, Koichi, to Tokyo Shibaura Denki Kabushiki Kaisha. Playback system for video disk having plural information tracks. 4,392,160, Cl. 358-327.000.

Ministere Des Affaires Sociales: *See—*
Tremblay, Richard; and Tremblay, Jean, 4,392,240, Cl. 378-207.000.

Minnesota Mining and Manufacturing Company: *See—*
Howell, Peter A., 4,391,646, Cl. 106-97.000.
Lu, Sun; and Chung, David B., 4,391,492, Cl. 350-351.000.
Pitzen, James F., 4,391,014, Cl. 15-231.000.
Vesley, George F., 4,391,687, Cl. 204-159.160.

Minnetti, Federico, to Officine Minnetti Di Ornella Raveggi & C.S.a.s. Machine for hank drawing and doffing. 4,391,360, Cl. 198-412.000.

Mintz, Donald; and Irani, Cyrus A., to Exxon Research & Engineering Co. Shear thickening well control fluid. 4,391,925, Cl. 523-130.000.

Miquel, Jean: *See—*
Cosyns, Jean; Juguin, Bernard; Le Page, Jean-Francois; and Miquel, Jean, 4,392,002, Cl. 585-329.000.

Miskinis, Robert J. Teflon ground glass adaptor. 4,391,779, Cl. 422-99.000.

Mita Industrial Co., Ltd.: *See—*
Kamezaki, Yasushi; Inoue, Eiichi; Nishihama, Hitoshi; Fushida, Akira; and Matsumoto, Joji, 4,391,892, Cl. 430-126.000.

Mita, Kikuo; Oyama, Masayuki; Yoshida, Takashi; Nakashima, Masato; Fujihara, Katsumi; and Nakakuki, Tadao, to A. Aoki & Associates. Pattern inspection system. 4,392,120, Cl. 382-22.000.

Mitama, Masataka, to Nippon Electric Co., Ltd. Radio transmitter having an output power control circuit. 4,392,245, Cl. 455-115.000.

Mitchell, Ernst K.; and Terry, Richard H., to Safekeeper Systems, Inc. Security cabinets for hotel rooms. 4,391,204, Cl. 109-39.000.

Mitchell, Joseph R.: *See—*
Heaslip, Lawrence J.; Hohulin, Alphia L.; and Mitchell, Joseph R., 4,391,319, Cl. 164-259.000.

Mitchell, Larry D.; and Keith, Charles W., Jr., to B-W Health Products, Inc. Multi-position wall spacer. 4,391,007, Cl. 5-60.000.

Mitchell, Paul B.: *See—*
Mitchell, Paul B., Jr.; and Mitchell, Paul B., 4,391,665, Cl. 156-72.000.

Mitchell, Paul B., Jr.; and Mitchell, Paul B. Method of making pile material. 4,391,665, Cl. 156-72.000.

Mitel Corporation: *See—*
Neathway, Graham; Cramp, Allan; and Hum, Albert, 4,392,206, Cl. 364-900.000.

Mitra, Gautam; Coan, Michael H.; and Wada, Shohachi, to Cutter Laboratories, Inc. Blood-coagulation-promoting products and methods of preparing them. 4,391,746, Cl. 260-112.00B.

Mitsi Toatsu Inorganic Chemicals, Inc.: *See—*
Mashio, Fujio; and Kitamura, Shuji, 4,391,945, Cl. 524-600.000.

Mitsubishi Denki Kabushiki Kaisha: *See—*
Iwatani, Shiro, 4,392,151, Cl. 357-72.000.
Tanaka, Hidcharu; Ishijima, Koji; and Koda, Toshihide, 4,391,573, Cl. 418-63.000.
Yatomi, Takeshi; and Tanaka, Yutaka, 4,392,041, Cl. 219-69.00W.

Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
TateBe, Yoshikazu; Egami, Masafumi; and Miyawaki, Toshimitsu, 4,391,231, Cl. 123-41.690.

Miyahara, Masahiko: *See—*
Ohyama, Hiroshi; Morita, Ken; Wada, Takuo; and Miyahara, Masahiko, 4,391,804, Cl. 424-245.000.

Miyake, Makoto: *See—*
Nakamura, Mikio; and Miyake, Makoto, 4,391,852, Cl. 427-150.000.

Miyano, Hiroshi, to Alps Electric Co., Ltd. Serial printer. 4,391,538, Cl. 400-145.100.

Miyasaka, Kiyoshi; and Higuchi, Mitsuo, to Fujitsu Limited. Semiconductor memory device with decoder for chip selection/write in. 4,392,212, Cl. 365-230.000.

Miyawaki, Toshimitsu: *See—*
TateBe, Yoshikazu; Egami, Masafumi; and Miyawaki, Toshimitsu, 4,391,231, Cl. 123-41.690.

Mizusawa, Akira, to Nifco Inc. Plastic fastener. 4,391,559, Cl. 411-45.000.

Mobil Oil Corporation: *See—*
Chu, Chin-Chiun, 4,391,739, Cl. 252-455.00Z.
Godbey, John K.; and Ballard, B. G., 4,391,135, Cl. 73-155.000.
Hungerford, Gordon P., 4,391,939, Cl. 524-377.000.
Rosinski, Edward J.; and Rubin, Mae K., 4,391,785, Cl. 423-329.000.
Warner, Barry N., 4,392,109, Cl. 324-350.000.
Wu, Margaret M., 4,391,998, Cl. 568-781.000.
Yan, Tsoung-Yuan, 4,391,782, Cl. 423-7.000.

Mochizuki, Hirohiko: *See—*
Nakano, Masao; Baba, Fumio; Nakano, Tomio; Takemae, Yoshihiro; and Mochizuki, Hirohiko, 4,392,211, Cl. 365-200.000.

Mochizuki, Keisuke: *See—*
Shinoi, Tsuyoshi; Mochizuki, Keisuke; Suzuki, Yoshimi; Kudoh, Masaru; and Hashimoto, Wataru, 4,392,024, Cl. 179-99.00R.

Mohr, Heinrich: *See—*
Fauth, Karl-Heinz; Mohr, Heinrich; and Immel, Wolfgang, 4,391,959, Cl. 526-70.000.

Mohrman, Raymond F., to Mon-a-therm, Inc. Temperature sensor. 4,392,005, Cl. 136-235.000.

Moklist, Oivind: *See—*
Vangbo, Hakan; Lundin, Bertil; and Moklint, Oivind, 4,391,667, Cl. 156-205.000.

Molina Bonillo, Juan J., to G. Siempelkamp GmbH & Co. Installations for the handling of molds associated with a transfer press. 4,391,577, Cl. 425-338.000.

Moline, Jerry A.: *See—*
Duca, James F.; and Moline, Jerry A., 4,392,156, Cl. 358-183.000.

Molins Limited: *See—*
Fox, Austin L., 4,391,083, Cl. 53-575.000.

Mollenkopf, Lloyd C.; and Branson, Daniel J., to Rosemount Office Systems, Inc. Movable panel assembly. 4,391,073, Cl. 52-241.000.

Mon-a-therm, Inc.: *See—*
Mohrman, Raymond F., 4,392,005, Cl. 136-235.000.

Monegon, Ltd.: *See—*
Cullis, Herbert M; and Stamminger, Reinhard, 4,392,008, Cl. 136-248.000.

Monfredo, Joseph R.; and Roth, Ronald H., to Johnson & Johnson Dental Products Company. Surgical dental articulator. 4,391,589, Cl. 433-63.000.

Monsanto Company: *See—*
Ellis, Earle R., 4,391,870, Cl. 428-218.000.
Morita, Eiichi, 4,391,953, Cl. 525-351.000.
Purdum, William R., 4,391,625, Cl. 71-86.000.

Montedison S.p.A.: *See—*
Masotti, Maurizio; Zentile, Antonio; and Cau, Pasqualino, 4,391,464, Cl. 293-120.000.
Merani, Gianfranco; and Anzuino, Giuseppe, 4,391,968, Cl. 528-321.000.

Mookherjee, Braja D.; Trenkle, Robert W.; Chast, Bernard J.; Ouwerkerk, Anton V.; Kamath, Venkatesh; and Mussinan, Cynthia J., to International Flavors & Fragrances Inc. Use of isomeric farnesene product-by-process for augmenting or enhancing the aroma of per-

fume compositions, colognes and perfumed articles. 4,391,717, Cl. 252-8.600.
Moor, Beat. Ski stick grip. 4,391,456, Cl. 280-821.000.
Moore, Dan T., III; and Fischer, Michael F., to Dan T. Moore Co. Automobile body panel hole closure. 4,391,384, Cl. 220-359.000.
Moore, John W., to Swan Corporation, The. Window trim. 4,391,072, Cl. 52-211.000.
Moore, Paul E., to Arcair Company. Exothermic cutting electrode. 4,391,209, Cl. 110-349.000.
Morca, Inc.: *See*—
Cruz, Mamerto M., Jr., 4,391,973, Cl. 536-56.000.
Morel, Charles: *See*—
Barkats, Gerard; Girard, Alain; Marchal, Jean; and Morel, Charles, 4,392,007, Cl. 136-248.000.
Moret, Michel, to Allibert S.A. Handling case with incorporated foldable lid. 4,391,386, Cl. 220-343.000.
Morey, Norval K. Method and apparatus for burning green wood chips. 4,391,205, Cl. 110-224.000.
Morgan, Jeffrey D.: *See*—
Spradlin, Joseph E.; Morgan, Jeffrey D.; Olson, Allan R.; and Howley, Joseph P., 4,391,829, Cl. 426-28.000.
Mori, Goro; and Ogura, Masaaki, to Ricoh Company, Ltd. Copying machine control apparatus comprising variable length program control. 4,391,507, Cl. 355-14.00R.
Mori, Hiromichi; Matsumoto, Jun; and Fujioka, Masanobu, to Kokusai Denshin Denwa Co., Ltd. Speech path switching system in time-divisional electronic telephone switching system. 4,392,224, Cl. 370-67.000.
Morichika, Toshiaki: *See*—
Murakami, Shinichi; Morichika, Toshiaki; Hiraishi, Hisashi; and Shiokawa, Hiroyuki, 4,391,635, Cl. 75-125.000.
Morimoto, Toru: *See*—
Kanda, Yoshitsugu; Kurikawa, Minoru; Morimoto, Toru; and Nakanishi, Kiyoshi, 4,391,854, Cl. 427-192.000.
Morin, Lionel. Safe ammunition for exhibition and target shooting. 4,391,199, Cl. 102-444.000.
Morinaga, Masaru, to NSK-Warner K.K. Buckle device. 4,391,024, Cl. 24-230.00A.
Morita, Eiichi, to Monsanto Company. Diene rubber compositions containing N,N'-dithioformanilide crosslinkers. 4,391,953, Cl. 525-351.000.
Morita, Ken: *See*—
Ohyama, Hiroshi; Morita, Ken; Wada, Takuo; and Miyahara, Masahiko, 4,391,804, Cl. 424-245.000.
Moriya, Michio, to Sumitomo Electric Industries, Ltd. Structure for mounting a brake pad abrasion detector. 4,391,350, Cl. 188-1.110.
Morizot, Georges: *See*—
Bloise, Rene; Lorang, Marcel; Morizot, Georges; and Boissonnade, Genevieve, 4,391,792, Cl. 423-617.000.
Morrison, Charles F., Jr., to Vac-Tec Systems, Inc. High rate magnetron sputtering of high permeability materials. 4,391,697, Cl. 204-298.000.
Morrison, Rocky V., to Discovision Associates. Hot sprue valve assembly for an injection molding machine. 4,391,579, Cl. 425-548.000.
Morrow, James G., Sr., to Manitowoc Company, Inc., The. Quick release mounting for a turntable bearing. 4,391,477, Cl. 308-221.000.
Moshofsky, Jerome F., to Smith, Lawrence M. Surgical staplers and staple. 4,391,401, Cl. 227-19.000.
Mosley, William H., Jr.: *See*—
Andren, Carl F.; and Mosley, William H., Jr., 4,392,232, Cl. 375-86.000.
Mostek Corporation: *See*—
Chan, Tsiu C., 4,392,210, Cl. 365-149.000.
Motorola Inc.: *See*—
Ecklund, Lawrence M., 4,392,254, Cl. 455-173.000.
Fette, Bruce, 4,392,018, Cl. 179-1.0SM.
Jasper, Steven C.; and Janc, Robert V., 4,392,138, Cl. 343-103.000.
Price, John J., Jr., 4,392,067, Cl. 307-475.000.
Williamson, Richard D.; and Selinko, George J., 4,391,883, Cl. 429-97.000.
Mouthon, Marc: *See*—
Kumar, Niraj; and Mouthon, Marc, 4,392,217, Cl. 368-188.000.
Mowdood, Syed K.: *See*—
Maxey, Frank S., deceased; and Mowdood, Syed K., 4,391,318, Cl. 152-359.000.
Moynihan, Robert E.: *See*—
Derick, Burton N.; Moynihan, Robert E.; and Wolfe, Jon W., 4,391,867, Cl. 428-195.000.
MTA Szegedi Biologiai Kozpont Enzimologiai Intezete: *See*—
Devenyi, Tibor; Bocsa, Klara K.; Kovats, Ferenc; Pongor, Sandor; Szabolcsi, Gertrud; and Such, Mihaly, 4,391,839, Cl. 426-626.000.
Mueller, Martin, to Owens-Illinois, Inc. Container manufacturing machine. 4,391,666, Cl. 156-84.000.
Mukaida, Yoshito: *See*—
Yamada, Yasuyuki; Akashi, Goro; Tsuji, Nobuo; Mukaida, Yoshito; and Fujiyama, Masaaki, 4,391,851, Cl. 427-130.000.
Mullejans, Robert: *See*—
Grossmann, Karl; and Mullejans, Robert, 4,392,185, Cl. 362-105.000.
Muller, Klaus: *See*—
Linder, Ernst; Maurer, Helmut; Muller, Klaus; and Rieger, Franz, 4,391,691, Cl. 204-408.000.
Muller, Michael; Scherrer, Herbert; and Kagi, Erwin, to Franz Buttner AG. Word processor print wheel assembly. 4,391,536, Cl. 400-144.200.
Muller, Michael: *See*—
Gibas, Christoph; and Muller, Michael, 4,392,117, Cl. 335-297.000.
Muller, Theo: *See*—
Fabian, Peter; and Muller, Theo, 4,391,879, Cl. 428-551.000.
Mundhenke, Rudolph F.; and Fifolt, Michael J., to Occidental Chemical Corporation. Process for the preparation of para-fluoroaniline. 4,391,991, Cl. 564-412.000.
Munekata, Kenichi; Unno, Kunihiko; and Shimizu, Norihiko, to Toyoda Koki Kabushiki Kaisha. Grinding machine with detection device for useable limit or grinding wheel. 4,391,066, Cl. 51-165.870.
Mungen, Richard: *See*—
Palm, John W.; and Mungen, Richard, 4,391,791, Cl. 423-574.00R.
Munnecke, Douglas M.: *See*—
Baumgarten, Jorg; Frommer, Werner; Schmidt, Delf; Schmidt, Friedrich; and Munnecke, Douglas M., 4,391,887, Cl. 435-42.000.
Murakami, Naoyuki; and Zyo, Hiroshi, to Murakami, Naoyuki. Loudspeaker. 4,391,346, Cl. 181-147.000.
Murakami, Shinichi; Morichika, Toshiaki; Hiraishi, Hisashi; and Shiokawa, Hiroyuki, to Kubota, Ltd. High Cr low Ni two-phased cast stainless steel. 4,391,635, Cl. 75-125.000.
Murakami, Shozo; Yamanaka, Hiroaki; Yokoyama, Kazuhiro; Yone, Yasuhiro; and Yamaguchi, Tokuji, to Nippon Steel Corporation. Method for classification of coals for coke production. 4,391,702, Cl. 209-10.000.
Murakami, Tadashi; and Kishida, Toshikatsu, to Nippon Steel Corporation. Slab heating furnace. 4,391,587, Cl. 432-121.000.
Muraski, Andrew A.: *See*—
Price, Ronn; Brown, Gary; Muraski, Andrew A.; and Muraski, William C., 4,392,119, Cl. 340-38.00L.
Muraski, William C.: *See*—
Price, Ronn; Brown, Gary; Muraski, Andrew A.; and Muraski, William C., 4,392,119, Cl. 340-38.00L.
Murphey, Joseph R., to Halliburton Company. Rapidly dissolvable silicates and methods of using the same. 4,391,643, Cl. 106-74.000.
Murphy, Robert M.: *See*—
Liang, Charles C.; Bolster, M. Elizabeth; and Murphy, Robert M., 4,391,729, Cl. 252-182.100.
Murray, Jesse L., to Tanner Companies, The. Expansion joint inserter for continuous curb laying machines. 4,391,549, Cl. 404-87.000.
Murrin, Horace T.: *See*—
Cook, Kenneth V.; Cunningham, Robert A., Jr.; and Murrin, Horace T., 4,391,143, Cl. 73-623.000.
Musgrave, Dwight S., to Owens-Corning Fiberglas Corporation. Insulated roof structure. 4,391,075, Cl. 52-404.000.
Mussinan, Cynthia J.: *See*—
Mookherjee, Braja D.; Trenkle, Robert W.; Chant, Bernard J.; Ouwerkerk, Anton V.; Kamath, Venkatesh; and Mussinan, Cynthia J., 4,391,717, Cl. 252-8.600.
Myers, Cielo S.: *See*—
Memon, Nazir A.; and Myers, Cielo S., 4,391,938, Cl. 524-270.000.
Myers, Frederick F., Jr.: *See*—
Corley, Robert C.; and Myers, Frederick F., Jr., 4,391,660, Cl. 149-19.900.
Myers, John E. Support assembly having releasable lever mounting for handle bar. 4,391,160, Cl. 74-551.800.
N.D.C. Co., Ltd.: *See*—
Kanda, Yoshitsugu; Kurikawa, Minoru; Morimoto, Toru; and Nakanishi, Kiyoshi, 4,391,854, Cl. 427-192.000.
Nabisco Brands, Inc.: *See*—
Spinelli, Louis A., 4,391,362, Cl. 198-855.000.
Nahm, Helmut; and Granzer, Ernold, to Hoechst Aktiengesellschaft. 4-Phenoxy-phenoxy-alkane-carboxylic acid derivatives and process for their manufacture. 4,391,995, Cl. 568-637.000.
Nair, Kumaran M., to Du Pont de Nemours, E. I., and Company. Screen-printable dielectric composition. 4,392,180, Cl. 361-321.000.
Naito, Masayuki: *See*—
Imada, Michio; and Naito, Masayuki, 4,391,497, Cl. 350-523.000.
Naitoh, Katsumi; and Yanagihara, Hideo, to NSK-Warner K. K. Retractor for seat belt with an alleviating device. 4,391,421, Cl. 242-107.700.
Nakagawa, Kenji; and Masuda, Isao, to Hoya Corporation. Alkali-free glass for photoetching mask. 4,391,916, Cl. 501-62.000.
Nakagawa, Yasuo: *See*—
Akiyama, Nobuyuki; Kembo, Yukio; Nakagawa, Yasuo; Aiuchi, Susumu; and Nomoto, Mineo, 4,391,511, Cl. 355-40.000.
Nakai, Hiromitsu: *See*—
Tomita, Yoshifumi; and Nakai, Hiromitsu, 4,391,885, Cl. 430-28.000.
Nakajima, Masao: *See*—
Shioyama, Giichi; Hata, Yoshitaka; and Nakajima, Masao, 4,391,247, Cl. 123-403.000.
Nakakuki, Tadao: *See*—
Mita, Kikuo; Oyama, Masayuki; Yoshida, Takashi; Nakashima, Masato; Fujihara, Katsumi; and Nakakuki, Tadao, 4,392,120, Cl. 382-22.000.
Nakamori, Shigeru: *See*—
Matsui, Hiroshi; Tsuchida, Takayasu; and Nakamori, Shigeru, 4,391,907, Cl. 435-115.000.
Nakamura, Mikio; and Miyake, Makoto, to Kanzaki Paper Manufacturing Co., Ltd. Process for preparing an acceptor coated sheet. 4,391,852, Cl. 427-150.000.
Nakamura, Nobuyuki: *See*—
Hori, Hisako; Kitamura, Nobu; Shirahata, Isao; and Nakamura, Nobuyuki, 4,391,955, Cl. 525-462.000.
Nakamura, Shunji; and Arao, Kozo, to Canon Kabushiki Kaisha. Developing device using magnetic developer. 4,391,512, Cl. 355-3.0DD.

Nakamura, Shunji: *See*—
Tamura, Yasuyuki; Kanbe, Junichiro; Nakamura, Shunji; Toyono, Tsutomu; and Takahashi, Tohru, 4,391,891, Cl. 430-120.000.

Nakane, Shigeru, to Takara Co., Ltd. Toy robot vehicle assembly. 4,391,060, Cl. 46-22.000.

Nakanishi, Kiyoshi: *See*—
Kanda, Yoshitsugu; Kurikawa, Minoru; Morimoto, Toru; and Nakanishi, Kiyoshi, 4,391,854, Cl. 427-192.000.

Nakanishi, Toyohiko: *See*—
Katayama, Tsutomu; and Nakanishi, Toyohiko, 4,391,835, Cl. 426-573.000.

Nakano, Jiro; and Ono, Hironobu, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method of and apparatus for communicating the operating condition of an internal combustion engine. 4,391,130, Cl. 73-117.300.

Nakano, Masao; Baba, Fumio; Nakano, Tomio; Takemae, Yoshihiro; and Mochizuki, Hirohiko, to Fujitsu Limited. Semiconductor memory device technical field. 4,392,211, Cl. 365-200.000.

Nakano, Tomio: *See*—
Nakano, Masao; Baba, Fumio; Nakano, Tomio; Takemae, Yoshihiro; and Mochizuki, Hirohiko, 4,392,211, Cl. 365-200.000.

Nakashima, Masato: *See*—
Mita, Kikuo; Oyama, Masayuki; Yoshida, Takashi; Nakashima, Masato; Fujihara, Katsumi; and Nakakuki, Tadao, 4,392,120, Cl. 382-22.000.

Nakauchi, Hideo; Kato, Shingo; and Ando, Yukio, to Bridgestone Tire Co., Ltd. Vibration-insulating rubber composition. 4,391,942, Cl. 524-526.000.

Nakayama, Kazuyuki: *See*—
Ueno, Kunihiko; Ishii, Akiyasu; Hukuda, Masazi; and Nakayama, Kazuyuki, 4,391,763, Cl. 264-15.000.

Nakazawa, Sadaharu, to Nissan Motor Co., Ltd. Vehicle cabin heater. 4,391,407, Cl. 237-12.30B.

Nalco Chemical Company: *See*—
Tai, Wun T., 4,391,932, Cl. 523-337.000.

Napoli, Joseph D., to Exxon Research and Engineering Co. Solar power module. 4,392,009, Cl. 136-251.000.

Naruo, Kyoichi: *See*—
Yamamoto, Nobuyuki; Naruo, Kyoichi; and Okita, Tsutomu, 4,391,874, Cl. 428-336.000.

National Hydro-Hoist Company: *See*—
Rutter, Henry A., 4,391,550, Cl. 405-7.000.

National Latex Products Co., The: *See*—
Gill, H. Ross, III, 4,391,063, Cl. 46-90.000.

National Research Development Corporation: *See*—
El-Menshawy, Mohamed F.; Woodrow, Peter A.; and Bhattacharyya, Sushantha K., 4,392,110, Cl. 324-453.000.
Mathieson, Ernest; Smith, Graham C.; and Gilvin, Philip J., 4,392,057, Cl. 250-385.000.
Sainz, Antonio J.; and Roberts, Victor C., 4,391,148, Cl. 73-861.250.
Smith, Kenneth C. A., 4,392,058, Cl. 250-492.200.

National Semiconductor Corporation: *See*—
Courreges, Francis G., 4,392,150, Cl. 357-51.000.
Sauer, Don R., 4,392,016, Cl. 179-1.0GS.

National Starch and Chemical Corporation: *See*—
Chiu, Chung-Wai, 4,391,836, Cl. 426-578.000.

Nattel, William, to GTE Sylvania Canada Limited. Electrical wiring box arrangement with alignable grounding strap. 4,392,012, Cl. 174-51.000.

NCR Corporation: *See*—
Cook, Donald M., 4,392,226, Cl. 371-61.000.
Pfeifer, Robert F.; and Trudel, Murray L., 4,391,650, Cl. 148-1.500.

Neary, Robin P.: *See*—
Carter, Leewood C.; and Neary, Robin P., 4,391,202, Cl. 108-51.300.

Neathway, Graham; Cramp, Allan; and Hum, Albert, to Mitel Corporation. Printer. 4,392,206, Cl. 364-900.000.

Negele, Richard; and Pfeifle, Dieter, to SKF Kugellagerfabriken GmbH. Roller bearing. 4,391,476, Cl. 308-207.00R.

Negishi, Fumio: *See*—
Ota, Akiho; and Negishi, Fumio, 4,391,381, Cl. 215-1.00C.

Nel-Tech Development, Inc.: *See*—
Iwata, Hideki, 4,392,125, Cl. 340-518.000.

Nelson, Alfred M.; and Rasekhi, Houshang, to Wang Laboratories, Inc. Apparatus and method for separating adhering media electrostatically. 4,392,179, Cl. 361-234.000.

Nelson, James A.: *See*—
Lazarus, Harrison; and Nelson, James A., 4,391,276, Cl. 604-266.000.

Nelson, John W.; and Jensen, Bruno, to PIXE International Corporation. Circular two-stage air particulate and gas sampler. 4,391,151, Cl. 73-863.230.

Nermes, Esko O.: *See*—
Aaltonen, Olavi A.; Malmstrom, Rolf E.; Nermes, Esko O.; and Tuominen, Tapio K., 4,391,632, Cl. 75-26.000.

Nespor, Tony. Automatic remote car starter. 4,392,059, Cl. 290-38.00D.

Newlin, John C.: *See*—
Marsh, Douglas D.; Feldman, Arthur E.; and Newlin, John C., 4,391,454, Cl. 280-47.350.

Neyret, Guy, to Sodex-Magister, Societe d'Exploitation. Piston-type locks. 4,391,112, Cl. 70-364.00A.

Ng, Kwokei J.: *See*—
Andresen, Brian D.; and Ng, Kwokei J., 4,391,778, Cl. 422-89.000.

Ng, Paul K.; and Fournel, Michael A., to Cutter Laboratories, Inc. Plasma protein fraction substantially free of acetate ions. 4,391,801, Cl. 424-177.000.

Nicholson, Harold J.: *See*—
Hsiung, Du Y.; Davis, Chester A.; and Nicholson, Harold J., 4,391,286, Cl. 132-7.000.

Nielsen, Asker J., Jr., to Omco Inc. Barrel lock sleeve. 4,391,110, Cl. 70-34.000.

Nienow, John F.: *See*—
Burnett, George H.; Claflin, Warren E.; Lauzillotti, Harry V.; Lilly, A. Clifton, Jr.; Nienow, John F.; Osdene, Thomas S.; and Wayte, Alline R., 4,391,285, Cl. 131-364.000.

Nifco Inc.: *See*—
Mizusawa, Akira, 4,391,559, Cl. 411-45.000.

Nigol, Olaf; and Houston, Herbert J., to Slater Steel Industries Limited. Method and apparatus for testing and/or adjusting vibration absorber for suspended cables. 4,391,125, Cl. 73-11.000.

Nigrelli, Biagio J., to Nigrelli Corporation. Loading blades for packaging apparatus. 4,391,078, Cl. 53-251.000.

Nigrelli Corporation: *See*—
Nigrelli, Biagio J., 4,391,078, Cl. 53-251.000.

Nihon Tokushu Noyaku Seizo K.K.: *See*—
Aya, Masahiro; Saito, Junichi; Yasui, Kazuomi; Kakabu, Shinzo; Kamochi, Atsumi; and Yamaguchi, Naoko, 4,391,629, Cl. 71-94.000.

Niinomi, Naoyuki; and Watanabe, Kunihiko, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument with musical composition fashion selectors. 4,391,176, Cl. 84-1.170.

Niioka, Takeharu; and Kobayashi, Isao, to Tokyo Shibaura Denki Kabushiki Kaisha. Broadcast wave receiving system. 4,392,246, Cl. 455-158.000.

Niizeki, Jiro: *See*—
Kogoma, Kiyoshi; Ohashi, Yu; Niizeki, Jiro; Sone, Norio; and Tobita, Takashi, 4,391,994, Cl. 568-593.000.

Nilsson, Claes T., to PLM AB. Preform of a thermoplastic. 4,391,861, Cl. 428-35.000.

Nilsson, Gosta. Method and a device for effecting rinsing of an inverted siphon, which forms part of a sewer. 4,391,288, Cl. 137-15.000.

Nimry, Tayseer S.; and Fields, Ellis K., to Standard Oil Company (Indiana). Polyimides-polyamides from tricyclo [4.2.1.$0^{2,5}$] nonane-3,4-dimethyl-3,4,7,8-tetracarboxylic acid dianhydride and dicarboxylic acids. 4,391,967, Cl. 528-189.000.

Nippon Electric Co., Ltd.: *See*—
Hirosaki, Botaro; and Hasegawa, Satoshi, 4,392,220, Cl. 370-18.000.
Kai, Tomokazu, 4,392,242, Cl. 455-33.000.
Maruta, Rikio, 4,392,234, Cl. 375-118.000.
Mitama, Masataka, 4,392,245, Cl. 455-115.000.
Ohyagi, Takashi, 4,392,135, Cl. 340-825.440.

Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Niinomi, Naoyuki; and Watanabe, Kunihiko, 4,391,176, Cl. 84-1.170.

Nippon Kayaku Kabushiki Kaisha: *See*—
Umezawa, Hamao; Aoyagi, Takaaki; Shirai, Tadashi; Nishizawa, Rinzo; Suzuki, Masao; and Saino, Tetsushi, 4,391,986, Cl. 562-444.000.

Nippon Kogaku K.K.: *See*—
Ishizaka, Sunao; and Hozumi, Toshiaki, 4,391,488, Cl. 350-257.000.

Nippon Oil Co., Ltd.: *See*—
Uemura, Seiichi; Yamamoto, Shunichi; Hirose, Takao; Takashima, Hiroaki; and Kato, Osamu, 4,391,788, Cl. 423-447.600.

Nippon Soda Company Limited: *See*—
Maeda, Umio; Shoji, Hirofumi; Wada, Yasusuke; and Horie, Yoshio, 4,391,743, Cl. 252-518.000.

Nippon Soken, Inc.: *See*—
Egami, Tsuneyuki; Kawai, Hisao; Kohama, Tokio; and Obayashi, Hideki, 4,391,132, Cl. 73-118.000.

Nippon Steel Corporation: *See*—
Murakami, Shozo; Yamanaka, Hiroaki; Yokoyama, Kazuhiro; Yone, Yasuhiro; and Yamaguchi, Tokuji, 4,391,702, Cl. 209-10.000.
Murakami, Tadashi; and Kishida, Toshikatsu, 4,391,587, Cl. 432-121.000.
Takechi, Hiroshi; Katoh, Hiroshi; Koyama, Kazuo; and Usami, Kazuhide, 4,391,653, Cl. 148-12.00C.

Nippon Telegraph & Telephone Public Corporation: *See*—
Kojima, Takafumi; Tamaki, Kenzo; and Yokota, Shiro, 4,392,026, Cl. 179-175.30R.
Shinoi, Tsuyoshi; Mochizuki, Keisuke; Suzuki, Yoshimi; Kudoh, Masaru; and Hashimoto, Wataru, 4,392,024, Cl. 179-99.00R.

Nippondenso Co., Ltd.: *See*—
Dohshita, Hidetoshi; Ishii, Yoshiya; and Fujitani, Nobuyuki, 4,391,241, Cl. 123-198.0DB.
Inoue, Yozo; Ito, Yoji; Hara, Kiyoshi; Usami, Kiyoshi; and Iwata, Yasuhiro, 4,391,320, Cl. 165-2.000.
Ito, Shinzo, 4,391,133, Cl. 73-119.00A.
Kobashi, Mamoru; Tanaka, Shinichiro; and Saji, Hideo, 4,391,244, Cl. 123-339.000.

Nishihama, Hitoshi: *See*—
Kamezaki, Yasuhi; Inoue, Eiichi; Nishihama, Hitoshi; Fushida, Akira; and Matsumoto, Joji, 4,391,892, Cl. 430-126.000.

Nishikawa, Masaji, to Olympus Optical Company Limited. Electrophotographic apparatus having means for adjusting the reproduction properties of subsequent copies after a first copy has been produced. 4,391,502, Cl. 355-3.0DD.

Nishikawa, Masao; Toshimitsu, Yoshihiko; Aoyama, Toshihiko; Takaoka, Tokuro; Aoki, Takashi; and Sato, Yoichi, to Honda Giken Kogyo Kabushiki Kaisha. Steering mechanism for vehicles equipped with power steering system. 4,391,342, Cl. 180-143.000.

Nishizawa, Rinzo: *See*—
Umezawa, Hamao; Aoyagi, Takaaki; Shirai, Tadashi; Nishizawa, Rinzo; Suzuki, Masao; and Saino, Tetsushi, 4,391,986, Cl. 562-444.000.

Nissan Motor Company, Limited: *See*—
Kosuge, Hideaki, 4,391,098, Cl. 60-602.000.
Matsuda, Toshiro, 4,392,202, Cl. 364-426.000.
Matsui, Fujio, 4,391,250, Cl. 123-438.000.
Nakazawa, Sadaharu, 4,391,407, Cl. 237-12.30B.
Shioyama, Giichi; Hata, Yoshitaka; and Nakajima, Masao, 4,391,247, Cl. 123-403.000.
Sugasawa, Fukashi; and Iizuka, Haruhiko, 4,391,240, Cl. 123-198.00F.
Takahashi, Takao, 4,391,305, Cl. 139-435.000.
Takamura, Tousaku, 4,391,566, Cl. 415-209.000.
Takemura, Toji; and Hirashima, Kenzo, 4,391,356, Cl. 192-84.00C.
Yamane, Ken; and Nissan Motor Co., Ltd., 4,391,184, Cl. 92-100.000.

Nisshin Steel Company, Ltd.: *See*—
Yamauchi, Takashi; Maruhashi, Shigeaki; and Hasegawa, Morihiro, 4,391,633, Cl. 75-53.000.

Nisso Petrochemical Industrie Co., Ltd.: *See*—
Kogoma, Kiyoshi; Ohashi, Yu; Niizeki, Jiro; Sone, Norio; and Tobita, Takashi, 4,391,994, Cl. 568-593.000.

Nitro Nobel AB: *See*—
Persson, Ingemar P., 4,391,403, Cl. 228-107.000.

Nitsuko Limited: *See*—
Shinoi, Tsuyoshi; Mochizuki, Keisuke; Suzuki, Yoshimi; Kudoh, Masaru; and Hashimoto, Wataru, 4,392,024, Cl. 179-99.00R.

Nitto Boseki Co., Ltd.: *See*—
Shono, Hiroaki; and Kikuchi, Toshiaki, 4,391,619, Cl. 65-12.000.

Nixdorf Computer AG: *See*—
Baitz, Gunter, 4,391,542, Cl. 400-605.000.

NL Industries, Inc.: *See*—
Herman, Daniel F.; and Kruse, Uno, 4,391,928, Cl. 523-201.000.
Mardis, Wilbur S.; and Finlayson, Claude M., 4,391,637, Cl. 106-20.000.

Noble, Milton L.; and Cleaveland, Bryan L., to General Electric Company. Electron discharge device with a spatially periodic focused beam. 4,392,078, Cl. 315-4.000.

Noga, Helen H.: *See*—
Medel, Louis W., Jr.; and Barak, Yoram, 4,391,574, Cl. 418-195.000.

Nogradi, Mihaly: *See*—
Korbonits, Dezso; Nogradi, Mihaly; Vermes nee Szluha, Borbala; Strelisky, Janos; Wolfner, Andras; Heja, Gergely; Kovacz, Gabor; Szegi, Jozsef; and Virag, Sandor, 4,391,821, Cl. 424-283.000.

Nomoto, Mineo: *See*—
Akiyama, Nobuyuki; Kembo, Yukio; Nakagawa, Yasuo; Aiuchi, Susumu; and Nomoto, Mineo, 4,391,511, Cl. 355-40.000.

Norris, Kenneth E. Trouble light assembly positioner. 4,392,188, Cl. 362-269.000.

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Trumble, William P.; Finn, Roger C.; and Jackson, Charles F. C., 4,392,014, Cl. 174-92.000.

NSK-Warner K. K.: *See*—
Naitoh, Katsumi; and Yanagihara, Hideo, 4,391,421, Cl. 242-107.700.

NSK-Warner K.K.: *See*—
Morinaga, Masaru, 4,391,024, Cl. 24-230.00A.

Oak Industries Inc.: *See*—
Denley, Ronald S., 4,391,845, Cl. 427-58.000.

Obayashi, Hideki: *See*—
Egami, Tsuneyuki; Kawai, Hisasi; Kohama, Tokio; and Obayashi, Hideki, 4,391,132, Cl. 73-118.000.

Occidental Chemical Corporation: *See*—
Mundhenke, Rudolph F.; and Fifolt, Michael J., 4,391,991, Cl. 564-412.000.

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Officine Minnetti Di Ornella Raveggi & C.S.a.s.: *See*—
Minnetti, Federico, 4,391,360, Cl. 198-412.000.

Ogawa, Toshiyuki: *See*—
Shibusawa, Mitsuo; and Ogawa, Toshiyuki, 4,391,508, Cl. 355-14.0CU.

Ogura, Masaaki: *See*—
Mori, Goro; and Ogura, Masaaki, 4,391,507, Cl. 355-14.00R.

Ogura, Masahiko: *See*—
Kawabata, Etsuo; Ogura, Masahiko; Takagi, Akinobu; and Fujimura, Akira, 4,391,246, Cl. 123-391.000.

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Saito, Koichi; and Ohara, Osamu, 4,391,857, Cl. 427-385.500.

Ohashi, Yu: *See*—
Kogoma, Kiyoshi; Ohashi, Yu; Niizeki, Jiro; Sone, Norio; and Tobita, Takashi, 4,391,994, Cl. 568-593.000.

Ohba, Shinya: *See*—
Aoki, Masakazu; Ando, Haruhisa; Ohba, Shinya; Hanamura, Shoji; Takemoto, Iwao; and Izawa, Ryuichi, 4,392,158, Cl. 358-213.000.

Ohe, Kempo: *See*—
Ide, Katsuyuki; Ohe, Kempo; and Kobayashi, Hisao, 4,392,086, Cl. 315-174.000.

Ohe, Kuniyoshi: *See*—
Kitane, Syoiti; Honjo, Shigeru; Ohe, Kuniyoshi; and Tobioka, Fumio, 4,391,658, Cl. 148-188.000.

Ohhara, Kazuya: *See*—
Yamada, Shigers; and Ohhara, Kazuya, 4,392,114, Cl. 333-28.00T.

Ohhashi, Shiro; Ubusawa, Fumiyoshi; Iwasaki, Shoji; and Manaka, Tetsuyuki, to Clarion Co., Ltd. Transceiver having interphone system. 4,392,243, Cl. 455-74.000.

Ohio State University, The: *See*—
Andresen, Brian D.; and Ng, Kwokei J., 4,391,778, Cl. 422-89.000.

Ohmori, Taiji, to Honda Giken Kogyo Kabushiki Kaisha. Control circuit for vehicle leveling system. 4,391,452, Cl. 280-6.100.

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Ohorodnik, Alexander: *See*—
Kaiser, Karl; and Ohorodnik, Alexander, 4,391,972, Cl. 528-499.000.

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Ohyama, Hiroshi; Morita, Ken; Wada, Takuo; and Miyahara, Masahiko, to Hokko Chemical Industry Company, Ltd. Imidazole derivatives and fungicidal composition containing the same. 4,391,804, Cl. 424-245.000.

Okabe, Takako; Itoh, Kunio; and Sugino, Takashi, to Matsushita Electric Industrial Co., Ltd. Terraced substrate semiconductor laser. 4,392,228, Cl. 372-46.000.

Okada, Shuhei, to Hitachi Maxell, Ltd. Magnetic recording disc cartridge with disc cleaning means. 4,392,170, Cl. 360-133.000.

Okamoto, Yoshihisa, to B. F. Goodrich Company, The. Process for preparing colorless hydroxyl epihalohydrin polymers. 4,391,970, Cl. 528-408.000.

Okaya Electric Industries Co., Ltd.: *See*—
Kamegaya, Takeo; Sekigawa, Tadahiko; Kurakami, Hiroshi; and Suzuki, Yoshiro, 4,392,075, Cl. 313-584.000.

Okita, Tsutomu: *See*—
Yamamoto, Nobuyuki; Naruo, Kyoichi; and Okita, Tsutomu, 4,391,874, Cl. 428-336.000.

Okoshi, Noboru; Kudo, Kin-ichi; and Shimoyama, Shoichi, to Dainippon Ink & Chemicals, Inc. Process for producing oil-modified and rosin-modified phenolic resin for printing inks. 4,391,640, Cl. 106-29.000.

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Hosaka, Akihiko; Okuyama, Kiyotaka; and Isobe, Yukihiro, 4,391,864, Cl. 428-64.000.

O'Laughlin, Richard L.: *See*—
Wang, Yu-Chang J.; Dursch Friedrich; O'Laughlin, Richard L.; and Prusik, Thaddeus, 4,391,755, Cl. 260-397.450.

Olennikov, Evgeny F.: *See*—
Bykhovsky, David G.; Voropaev, Albert A.; Olennikov, Evgeny F.; and Lopatina, Alla V., 4,392,047, Cl. 219-145.210.

Olson, Allan H., to Du Pont de Nemours, E. I., and Company. Stabilized suspension of glass bubbles in an aqueous dispersion of tetrafluoroethylene polymer. 4,391,930, Cl. 523-219.000.

Olson, Allan R.: *See*—
Spradlin, Joseph E.; Morgan, Jeffrey D.; Olson, Allan R.; and Howley, Joseph P., 4,391,829, Cl. 426-28.000.

Olympus Optical Company Limited: *See*—
Ando, Otaro; and Suwaki, Toshitaka, 4,391,282, Cl. 128-660.000.
Imada, Michio; and Naito, Masayuki, 4,391,497, Cl. 350-523.000.
Imai, Toshihiro; and Yamada, Toyotaka, 4,391,521, Cl. 356-225.000.
Konoshima, Katunaga, 4,391,287, Cl. 134-99.000.
Nishikawa, Masaji, 4,391,502, Cl. 355-3.0DD.
Osanai, Akira, 4,391,416, Cl. 242-68.100.

Omco Inc.: *See*—
Nielsen, Anker J., Jr., 4,391,110, Cl. 70-34.000.

Ono, Hironobu: *See*—
Nakano, Jiro; and Ono, Hironobu, 4,391,130, Cl. 73-117.300.

Opalka, Chester J., Jr.: *See*—
Lesher, George Y.; Opalka, Chester J., Jr.; and Page, Donald F., 4,391,811, Cl. 424-263.000.

Organisation Europeenne de Recherches Spatiales: *See*—
O'Sullivan, Dermot; and Weinberg, Alan, 4,392,103, Cl. 323-222.000.

Original Hanau Heraeus GmbH: *See*—
Schmid, Helmut; Bock, Martin; and Kampf, Gunther, 4,391,522, Cl. 356-326.000.

Orlando, Charles M.: *See*—
Cleveland William K. S.; Webb, Jimmy L.; and Orlando, Charles M., 4,391,996, Cl. 568-726.000.

Orlite Engineering Ltd.: *See*—
Kadim, Azriel, 4,391,055, Cl. 42-50.000.

Orlowski, Ronald C.; and Seyler, Jay K., to Armour Pharmaceutical Company. Des asparagine-3-calcitonin. 4,391,747, Cl. 260-112.50T.

Orshansky Transmission Corporation: *See*—
Millar, Robert W., 4,391,292, Cl. 137-269.000.

Ortloff, John E., to Exxon Production Research Co. Multiline piggable fluid swivel. 4,391,298, Cl. 137-615.000.

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Yamada, Takaaki; Osakabe, Yoshio; and Tsuda, Yukio, 4,392,253, Cl. 455-165.000.

Osanai, Akira, to Olympus Optical Co., Ltd. Reel shaft device of a magnetic recording tape running apparatus. 4,391,416, Cl. 242-68.100.

Osdene, Thomas S.: *See*—
Burnett, George H.; Claflin, Warren E.; Lanzillotti, Harry V.; Lilly, A. Clifton, Jr.; Nienow, John F.; Osdene, Thomas S.; and Wayte, Alline R., 4,391,285, Cl. 131-364.000.

Osrow, Harold, to Osrow Products Corp. Kitchen appliance for making farinaceous products. 4,391,575, Cl. 425-190.000.
Osrow Products Corp.: *See—*
Osrow, Harold, 4,391,575, Cl. 425-190.000.
Osterhout, David J.: *See—*
Foley, James W. B.; and Osterhout, David J., 4,392,172, Cl. 361-8.000.
Ostermayer, Frederick W., Jr.: *See—*
Buckley, Reginald R.; and Ostermayer, Frederick W., Jr., 4,391,683, Cl. 204-129.300.
Ostlund, Roland; and Ostlund, Rolf. Device in connection with cameras. 4,392,183, Cl. 362-11.000.
Ostlund, Rolf: *See—*
Ostlund, Roland; and Ostlund, Rolf, 4,392,183, Cl. 362-11.000.
O'Sullivan, Dermot; and Weinberg, Alan, to Organisation Europeenne de Recherches Spatiales. Current sensing regulator. 4,392,103, Cl. 323-222.000.
Ota, Akiho; and Negishi, Fumio, to Yoshino Kogyosho Co., Ltd. Paint-coated bottle. 4,391,381, Cl. 215-1.00C.
Ota, Yoshihiko; and Kosaka, Yositeru, to Victor Company of Japan, Ltd. Recorded tape, speed-change reproducing system. 4,392,161, Cl. 360-10.300.
Otoda, Ichizo: *See—*
Maruyama, Teruo; Ichiyanagi, Takashi; and Otoda, Ichizo, 4,392,168, Cl. 360-129.000.
Outboard Marine Corporation: *See—*
Anderson, Philip A., 4,391,236, Cl. 123-149.00C.
Outokumpu Oy: *See—*
Aaltonen, Olavi A.; Malmstrom, Rolf E.; Nermes, Esko O.; and Tuominen, Tapio K., 4,391,632, Cl. 75-26.000.
Ouwerkerk, Anton V.: *See—*
Mookherjee, Braja D.; Trenkle, Robert W.; Chant, Bernard J.; Ouwerkerk, Anton V.; Kamath, Venkatesh; and Mussinan, Cynthia J., 4,391,717, Cl. 252-8.600.
Overly, Larry L.: *See—*
Wood, Thomas D.; Reiss, Garry K.; and Overly, Larry L., 4,391,595, Cl. 474-33.000.
Owen, Robert B.; and Witherow, William K., to United States of America, National Aeronautics and Space Administration. Dual laser optical system and method for studying fluid flow. 4,391,518, Cl. 356-129.000.
Owens-Corning Fiberglas Corporation: *See—*
Musgrave, Dwight S., 4,391,075, Cl. 52-404.000.
Owens-Illinois, Inc.: *See—*
Mueller, Martin, 4,391,666, Cl. 156-84.000.
Whitney, Ralph H., 4,392,055, Cl. 215-307.000.
Oy Sisu-Auto Ab: *See—*
Fagerstedt, Nils, 4,391,455, Cl. 280-407.000.
Oyama, Masayuki: *See—*
Mita, Kikuo; Oyama, Masayuki; Yoshida, Takashi; Nakashima, Masato; Fujihara, Katsumi; and Nakakuki, Tadao, 4,392,120, Cl. 382-22.000.
Ozaki, Keiji: *See—*
Ichikawa, Katsumi; Amano, Itaru; Ozaki, Keiji; and Suzuki, Seiichi, 4,391,769, Cl. 264-326.000.
Ozite Corporation: *See—*
Pickens, Robert C., Jr.; Thomas, Reese R.; and Somerville, Ronald, 4,391,866, Cl. 428-92.000.
P.O.R. Microtrans AB: *See—*
Risman, Per O., 4,392,039, Cl. 219-10.55A.
Pack, Ernest A., to B.H.F. (Engineering) Limited. Apparatus for breaking articles. 4,391,413, Cl. 241-99.000.
Padco, Inc.: *See—*
Janssen, Craig R., 4,391,013, Cl. 15-210.00R.
Padro, Carlos E. L.: *See—*
Ciriza, Santiago A.; and Padro, Carlos E. L., 4,391,974, Cl. 544-030.000.
Paffrath, Edgar C., to Amigo Sales, Inc. Lifting apparatus adapted for mounting in a vehicle trunk. 4,391,379, Cl. 212-187.000.
Pagano, Victor H., to United States of America, Army. Logistic vehicle armor. 4,391,178, Cl. 89-36.00H.
Page, Donald F.: *See—*
Lesher, George Y.; Opalka, Chester J., Jr.; and Page, Donald F., 4,391,811, Cl. 424-263.000.
Pako Corporation: *See—*
Diesch, Robert E., 4,391,082, Cl. 53-520.000.
Palm, John W.; and Reed, Robert L., to Standard Oil Company (Indiana). Method and apparatus for reducing the ammonia concentration of sulfur recovery facility gas streams. 4,391,790, Cl. 423-574.00R.
Palm, John W.; and Mungen, Richard, to Standard Oil Company (Indiana). Low temperature sulfur recovery. 4,391,791, Cl. 423-574.00R.
Palmer, Roger C., to Intermec Corporation. Method and apparatus for controlling the area of a thermal print medium that is exposed by a thermal printer. 4,391,535, Cl. 400-120.000.
Panasiuk, Wladyslaw: *See—*
Wyszkowski, Jerzy; Panasiuk, Wladyslaw; Koprek, Stanislaw; and Piechal, Andzei, 4,391,654, Cl. 148-16.600.
Pankove, Jacques I.; and Wu, Chung P., to RCA Corporation. Solar cell structure incorporating a novel single crystal silicon material. 4,392,011, Cl. 136-261.000.
Pappas, Peter G., to Standard Oil Company (Indiana). Dispersant viscosity index improver comprising reaction product of a styrene-maleic anhydride copolymer, an aliphatic alcohol and a tertiary amino alcohol. 4,391,721, Cl. 252-51.50A.
Papst Motoren GmbH & Co. KG: *See—*
Cap, Heinrich, 4,391,398, Cl. 226-4.000.
Papuchon, Michel; and Puech, Claude, to Thomson-CSF. Electrically controlled electro-optical switch and integrated optical circuit incorporating such a switch. 4,391,486, Cl. 350-96.140.
Paris, Jacques: *See—*
Folcher, Gerard; and Paris, Jacques, 4,391,881, Cl. 429-111.000.
Parisotto, Francesco, to CALZATURIFICIO S.C.A.R.P.A. S.a.c. di Parisotto Francesco & C. Covering element or tongue for rock-climbing and similar sport boots. 4,391,049, Cl. 36-114.000.
Parkola, Walter R., to Exxon Research and Engineering Co. Multilayer ink jet apparatus. 4,392,145, Cl. 346-140.00R.
Parr, Charles H.: *See—*
Hannibal, Alan J.; and Parr, Charles H., 4,391,594, Cl. 464-80.000.
Pasdera, Leonard A.: *See—*
Lemoine, Maurice G.; and Pasdera, Leonard A., 4,392,159, Cl. 358-319.000.
Pasmannik, Vitaly I.; and Sakharov, Viktor P. Method of adjusting phase shift in amplification multicavity klystron and device therefor. 4,392,079, Cl. 315-5.390.
Passat-Maschinenbau GmbH: *See—*
Albers, Richard R., 4,391,108, Cl. 68-143.000.
Pasternack, Adalbert: *See—*
Hinz, Claus-Dieter; and Pasternack, Adalbert, 4,390,997, Cl. 2-81.000.
Patashnick, Harvey; and Rupprecht, Georg. Microbalance and method for measuring the mass of matter suspended within a fluid medium. 4,391,338, Cl. 177-210.0FP.
Pate, Daniel R., to SCM Corporation. Process for continuous fluidization of shortening. 4,391,838, Cl. 426-606.000.
Paul, Jim N. Elevatable scaffold. 4,391,345, Cl. 182-141.000.
Paule, Kurt; Schadlich, Fritz; Gerschner, Martin; and Hornung, Friedrich, to Robert Bosch GmbH. Electronic control and regulating system. 4,392,093, Cl. 318-245.000.
Payne, Frank, to Robertshaw Controls Company. Electrical switch construction. 4,392,034, Cl. 200-81.400.
Payton, Charles E.: *See—*
Coon, Julian B.; Fowler, James C.; Payton, Charles E.; and Waters, Kenneth H., 4,391,336, Cl. 175-45.000.
Pearl, David R.: *See—*
Gerber, Heinz J.; and Pearl, David R., 4,391,168, Cl. 83-34.000.
Pearlman, Samuel R., to Becton Dickinson and Company. Assay for free thyroid hormone. 4,391,795, Cl. 424-1.000.
Pears, Gordon E. A., to Imperial Chemical Industries PLC. Coated polyester films. 4,391,767, Cl. 264-210.300.
Peck, Alan M.; Tutt, Kingsley J.; and Walter, Andrew G. N., to USM Corporation. Machine adapted for use in the manufacture of shoes. 4,391,011, Cl. 12-1.00B.
Peercy, Paul S.: *See—*
Land, Cecil E.; and Peercy, Paul S., 4,391,901, Cl. 430-495.000.
Peet, Norton P.: *See—*
Alexander, Catherine A.; Cregge, Robert J.; and Peet, Norton P., 4,391,806, Cl. 424-248.400.
Alexander, Catherine A.; Cregge, Robert J.; and Peet, Norton P., 4,391,807, Cl. 424-248.400.
PEG Perego-Pines Deutschland GmbH: *See—*
Glaser, Dieter, 4,391,453, Cl. 280-47.400.
Peil, William: *See—*
Brown, Thomas A.; and Peil, William, 4,392,081, Cl. 315-46.000.
Pennwalt Corporation: *See—*
Radice, Peter F., 4,392,178, Cl. 361-233.000.
Perego, Lucio C. Packing container. 4,391,367, Cl. 206-315.00R.
Peries, Jean-Pierre: *See—*
Billon, Alain; Le Page, Jean-Francois; Peries, Jean-Pierre; and Simandoux, Jean-Claude, 4,391,700, Cl. 208-86.000.
Perkins, Henry T.; Saunders, Kim D.; and Green, Albert W., to United States of America, Navy. Three-axis current meter. 4,391,136, Cl. 73-189.000.
Perry, LaRelle T. Drill jig. 4,391,558, Cl. 408-110.000.
Perske, Manfred: *See—*
Landrock, Jurgen B.; Perske, Manfred; and Tandjung, Halim S., 4,392,097, Cl. 318-696.000.
Persson, Ingemar P., to Nitro Nobel AB. Method of explosion-welding rolling billets intended for package rolling. 4,391,403, Cl. 228-107.000.
Pesce, Eugene B.; and Krikava, James A. Water-alcohol injection apparatus for I.C.E. 4,391,230, Cl. 123-25.00E.
Peters, Arthur: *See—*
Brown, Richard P.; Barlow, George J.; and Peters, Arthur, 4,392,201, Cl. 364-200.000.
Peters, Klaus-Jurgen: *See—*
Jaggle, Gunther; Peters, Klaus-Jurgen; and Riel, Klaus, 4,391,252, Cl. 123-454.000.
Petersen, Helge H., to F. L. Smidth & Co. Method of conditioning exhaust gases from coal firing. 4,391,207, Cl. 110-342.000.
Petersen, Olfert H., to Slagteriernes Forskningsinstitut. Apparatus for determining the properties of a material having plastic properties by determining its density. 4,391,141, Cl. 73-433.000.
Peterson, Francis C., to Illinois Tool Works, Inc. Centrifugal switching system. 4,392,033, Cl. 200-80.00R.
Pfeifer, Robert F.; and Trudel, Murray L., to NCR Corporation. Method for fabricating improved complementary metal oxide semiconductor devices. 4,391,650, Cl. 148-1.500.
Pfeiffer, Doris: *See—*
Kuschel, Frank; Demus, Dietrich; Pfeiffer, Doris; and Deutscher, Hans-Joachim, 4,391,730, Cl. 252-299.100.
Pfeifle, Dieter: *See—*
Negele, Richard; and Pfeifle, Dieter, 4,391,476, Cl. 308-207.00R.

Pfizer Inc.: *See*—
Harbert, Charles A.; Johnson, Michael R.; and Melvin, Lawrence S., Jr., 4,391,827, Cl. 424-331.000.
Pflederer, Fred R., to A. O. Smith Corporation. Hole reinforcement. 4,391,301, Cl. 138-103.000.
Pham, Anh T., to Chrysler France. Suspension device. 4,391,435, Cl. 267-140.100.
Phelps Dodge Industries, Inc.: *See*—
Hilker, George D., 4,391,848, Cl. 427-118.000.
Philip Morris, Incorporated: *See*—
Burnett, George H.; Claflin, Warren E.; Lanzillotti, Harry V.; Lilly, A. Clifton, Jr.; Nienow, John F.; Osdene, Thomas S.; and Wayte, Alline R., 4,391,285, Cl. 131-364.000.
Phillips Petroleum Company: *See*—
Capshew, Charles E., 4,391,736, Cl. 252-429.00B.
Meister, John J., 4,391,719, Cl. 252-8.55D.
Phillips, Richard B., to International Paper Company. Low energy TMP furnish of improved strength by ozonation and press drying. 4,391,670, Cl. 162-12.000.
Piano, Renzo, to Fiat Auto S.p.A. Assembly separating a passenger compartment from an engine compartment. 4,391,465, Cl. 296-208.000.
Pickens, Robert C., Jr.; Thomas, Reese R.; and Somerville, Ronald, to Ozite Corporation. Cut pile fabric with texturized loops. 4,391,866, Cl. 428-92.000.
Piechal, Andzei: *See*—
Wyszkowski, Jerzy; Panasiuk, Wladyslaw; Koprek, Stanislaw; and Piechal, Andzei, 4,391,654, Cl. 148-16.600.
Pietraschke, Roy. Solar heated grain drying system. 4,391,046, Cl. 34-93.000.
Pilot Mannenhitsu Kabushiki Kaisha: *See*—
Yoshizawa, Naomi; and Terashima, Akira, 4,392,244, Cl. 455-79.000.
Pimlott, John R., to Dow Chemical Company, The. Chlorine cell design for electrolyte series flow. 4,391,693, Cl. 204-237.000.
Pinckney Molded Plastics, Inc.: *See*—
Stahl, Edward L.; and Kreeger, Elsmer W., 4,391,369, Cl. 206-506.000.
Pioneer De-Icing Services, Inc.: *See*—
Filmyer, Wm. G., 4,391,393, Cl. 222-642.000.
Piramoon, Alireza; and Woodruff, Rebecca J., to Beckman Instruments, Inc. Hanger for centrifuge buckets. 4,391,597, Cl. 494-20.000.
Pitney Bowes Inc.: *See*—
Chang, Mike S. H.; and Berman, Michael F., 4,391,888, Cl. 430-57.000.
Couper, Robert A.; and Denning, Bruce S., 4,392,197, Cl. 364-200.000.
Pitzen, James F., to Minnesota Mining and Manufacturing Company. Cleaning wiper. 4,391,014, Cl. 15-231.000.
PIXE International Corporation: *See*—
Nelson, John W.; and Jensen, Bruno, 4,391,151, Cl. 73-863.230.
Planteline, Pierre; and Machetel, Roger, to Groupement d'Interet Econoique de Recherche et de Developpment PSA. Electronic controller for controlling the air/fuel ratio of the mixture supplied to an internal combustion engine. 4,391,251, Cl. 123-440.000.
Plath, Jurgen: *See*—
Jeschke, Peter; and Plath, Jurgen, 4,391,392, Cl. 222-598.000.
Plessey Overseas Limited: *See*—
Hesketh, Truman H., 4,392,221, Cl. 370-54.000.
PLM AB: *See*—
Nilsson, Claes T., 4,391,861, Cl. 428-35.000.
Plunkett, Luther C., Jr., to Lanier Business Products, Inc. Apparatus for identifying a dictate station by providing an automatically generated sequence of signals and a manually entered sequence of signals. 4,392,218, Cl. 369-29.000.
Pochon, Remy: *See*—
Polzer, Erich; Ruetz, Gottfried; Schmolz, Hubert; and Pochon, Remy, 4,391,096, Cl. 60-335.000.
Poclain: *See*—
Taghon, Daniel, 4,391,341, Cl. 180-9.20R.
Pointon, David W., to Datak Corporation, The. Methods of making adhesive articles and resulting products. 4,391,853, Cl. 427-152.000.
Polaroid Corporation: *See*—
Kaplan, Jonathan I., 4,391,039, Cl. 29-884.000.
Schwarzel, William C.; and Taylor, Lloyd D., 4,391,895, Cl. 430-215.000.
Pollock, James F.: *See*—
Bentley, Peter D.; and Pollock, James F., 4,392,049, Cl. 219-401.000.
Polychrome Corporation: *See*—
Shimazu, Ken-ichi; and Deutsch, Albert, 4,391,894, Cl. 430-154.000.
Polymer Corporation, The: *See*—
Scheetz, Howard A., 4,391,943, Cl. 524-538.000.
Scheetz, Howard A., 4,391,951, Cl. 525-166.000.
Scheetz, Howard A., 4,391,956, Cl. 525-425.000.
Polzer, Erich; Ruetz, Gottfried; Schmolz, Hubert; and Pochon, Remy, to Voith Getriebe KG. Hydrodynamic reversing transmission. 4,391,096, Cl. 60-335.000.
Pomfret, Colin T.: *See*—
Greier, Josef; and Pomfret, Colin T., 4,391,238, Cl. 123-193.00C.
Pongor, Sandor: *See*—
Devenyi, Tibor; Bocsa, Klara K.; Kovats, Ferenc; Pongor, Sandor; Szabolcsi, Gertrud; and Such, Mihaly, 4,391,839, Cl. 426-626.000.
Porter-Bennett, David E., to Toro Company, The. Powered ground care implement. 4,391,041, Cl. 30-296.00R.
Portz, Willi: *See*—
Kersting, Hans-Joachim; Wolfrum, Erhard; Portz, Willi; and Strauss, Georg, 4,391,786, Cl. 423-442.000.
Pote, Bruce M.: *See*—
Smith, Donald A.; and Pote, Bruce M., 4,391,561, Cl. 414-218.000.
Powell, John M. Form tie. 4,391,429, Cl. 249-84.000.
Powell Manufacturing Company, Inc.: *See*—
Wilson, Robert W., 4,391,084, Cl. 56-27.500.
PPG Industries, Inc.: *See*—
Tamosauskas, Albert E.; and Temple, Chester S., 4,391,876, Cl. 428-392.000.
Prager, Lee A.: *See*—
Lester, James N.; and Prager, Lee A., 4,392,089, Cl. 315-313.000.
Precision Plumbing Products, Inc.: *See*—
Stipe, Lester E., 4,391,295, Cl. 137-522.000.
Preisler, Eberhard; Hofmann, Bernhard; and Holzem, Johannes, to Hoechst Aktiengesellschaft. Process for removing molybdenum from aqueous salt solutions. 4,391,714, Cl. 210-670.000.
Prest, William M., Jr.; and Roberts, Frederick J., Jr., to Xerox Corporation. Selectively altering the bulk properties of polymer structures. 4,391,537, Cl. 400-144.200.
Price, Edgar E.: *See*—
Seachman, Ned J.; and Price, Edgar E., 4,392,142, Cl. 346-1.100.
Price, John J., Jr., to Motorola, Inc. Logic select circuit. 4,392,067, Cl. 307-475.000.
Price, Ronn; Brown, Gary; Muraski, Andrew A.; and Muraski, William C., to U.S. Computer Systems, Inc. Apparatus and method for monitoring the arrival and duration of stay of a vehicle at a drive-in window. 4,392,119, Cl. 340-38.00L.
Priebe, Fritz, to SMS Schloemann-Siemag Aktiengesellschaft. Combined hydraulic clamping and rotating saddle device on forging presses. 4,391,122, Cl. 72-481.000.
Prim, David F.; and Greiff, Carl D. Lumber marking system. 4,392,204, Cl. 364-478.000.
Process Development Corporation: *See*—
Colburn, William A., 4,391,411, Cl. 241-1.000.
Procter & Gamble Company, The: *See*—
Bacon, Dennis R.; and Bossu, Frank P., 4,391,723, Cl. 252-90.000.
Bacon, Dennis R., 4,391,724, Cl. 252-90.000.
Bossu, Frank P., 4,391,725, Cl. 252-90.000.
Koster, Robertus J. C., 4,391,726, Cl. 252-99.000.
Propylox: *See*—
Hardy, Nicolas; Lerot, Luc; and Walraevens, Rene, 4,391,753, Cl. 549-525.000.
Pruett, Edwin C.; Robertson, Kem B.; and Loughead, Tomas E., to United States of America, National Aeronautics and Space Administration. Satellite retrieval system. 4,391,423, Cl. 244-161.000.
Prusik, Thaddeus: *See*—
Wang, Yu-Chang J.; Dursch Friedrich; O'Laughlin, Richard L.; and Prusik, Thaddeus, 4,391,755, Cl. 260-397.450.
PT Components, Inc.: *See*—
Min, Young K., 4,392,098, Cl. 318-758.000.
Puccini, Sergio E.: *See*—
Simmons, Nathaniel; Magnusson, Stig; Puccini, Sergio E.; McLaughlin, Donald W.; and Stelte, David J., 4,392,223, Cl. 370-63.000.
Puech, Claude: *See*—
Papuchon, Michel; and Puech, Claude, 4,391,486, Cl. 350-96.140.
Pugh, Robert J., to Gestetner Manufacturing Limited. Magnetic brush developer unit for photocopier. 4,391,503, Cl. 355-3.0DD.
Pulp and Paper Research Institute of Canada: *See*—
Azarniouch, Mahmoud K., 4,391,671, Cl. 162-30.100.
Purdum, William R., to Monsanto Company. Diesters of N-alkyl substituted amino methyl phosphonic acid useful as herbicides. 4,391,625, Cl. 71-86.000.
Puryear, John W., to Brunswick Corporation. Silent, anti-reverse actuator mechanism. 4,391,418, Cl. 242-84.20A.
Quaker Oats Company, The: *See*—
Akerberg, Denis W.; and Watson, David D., 4,391,946, Cl. 524-849.000.
Queen's University at Kingston: *See*—
Wolfe, Saul; and Shaw, Chia-Cheng, 4,391,975, Cl. 544-90.000.
Quell, Peter: *See*—
Forster, Siegfried; Quell, Peter; and Jaegers, Huber, 4,391,227, Cl. 122-16.000.
Quest Medical, Inc.: *See*—
Thompson, Thomas C., 4,391,598, Cl. 604-65.000.
R.I.A.T.: *See*—
Grenier, Yves, 4,391,109, Cl. 69-30.000.
R.N.L.I. (Trading) Limited: *See*—
Brinton, Michael B. J.; Barnes, John; and Chandler, Peter D., 4,391,239, Cl. 123-198.00E.
Radice, Peter F., to Pennwalt Corporation. Apparatus for the rapid continuous corona poling of polymeric films. 4,392,178, Cl. 361-233.000.
Raether, Wolfgang: *See*—
Blume, Ernst; Schaper, Wolfgang; Raether, Wolfgang; and Dittmar, Walter, 4,391,805, Cl. 424-246.000.
Raisson, Gerard: *See*—
Bonnor, Yannick; Raisson, Gerard; and Honnorat, Yves, 4,391,772, Cl. 419-23.000.
Ralston Purina Company: *See*—
Ederle, John A.; Hoer, Ralph A.; and Irwin, George H., 4,391,840, Cl. 426-641.000.

Ramot University Authority for Applied Research & Industrial Development Ltd.: *See*—
Konforti, Naim; and Marom, Emanuel, 4,392,155, Cl. 358-106.000.

Rand, Robert W.; Snow, Harold D.; Elliott, David G.; and Haskins, Glenn M. Induction heating apparatus for use in causing necrosis of neoplasm. 4,392,040, Cl. 219-10.710.

Rasekhi, Houshang: *See*—
Nelson, Alfred M.; and Rasekhi, Houshang, 4,392,179, Cl. 361-234.000.

Rassmann, Christoph: *See*—
Hauschopp, Alois; Schneider, Hans-Dieter; and Rassmann, Christoph, 4,391,471, Cl. 299-43.000.

Rausing, Hans, to Tetra Pak Developpement SA. Closing arrangement. 4,391,385, Cl. 220-307.000.

Raymond, Leonard S., to United States of America, Energy. Method of preparing high-temperature-stable thin-film resistors. 4,391,846, Cl. 427-99.000.

Raynes, Edward P.: *See*—
Harrison, Kenneth J.; Raynes, Edward P.; Saunders, Frances C.; and Thompson, David J., 4,391,489, Cl. 350-349.000.

Raytheon Company: *See*—
Day, William J.; and Weiss, Bernard J., 4,392,038, Cl. 219-10.55D.

RCA Corporation: *See*—
Carlson, David J., 4,392,022, Cl. 179-2.0TV.
Cowden, James J., 4,391,696, Cl. 204-297.00W.
Kaganowicz, Grzegorz; and Robinson, John W., 4,391,843, Cl. 427-41.000.
Pankove, Jacques I.; and Wu, Chung P., 4,392,011, Cl. 136-261.000.
Rinehart, James K.; Willis, Donald H.; and Luz, David W., 4,392,090, Cl. 315-411.000.
Schade, Otto H., Jr., 4,392,112, Cl. 330-252.000.
Steigmeier, Edgar F.; and Audenet, Heinrich, 4,391,524, Cl. 356-338.000.
Wang, Chih C.; and Bates, Ronald F., 4,391,720, Cl. 252-49.600.
Ziegel, Douglas H., 4,391,520, Cl. 356-154.000.

Read, Stuart W. Garment. 4,390,996, Cl. 2-70.000.

Rebeschi, Thomas J.; and Kapoor, Mohan L., to United States of America, Army. Sustainer circuit for plasma display panels. 4,392,084, Cl. 315-169.400.

Red Fox Industries, Inc.: *See*—
Crosby, Gary A., 4,391,703, Cl. 210-151.000.

Reed, Lehman T., to Midway Fishing Tool Co. Geothermal well head and actuator assembly. 4,391,324, Cl. 166-70.000.

Reed, Robert L.: *See*—
Palm, John W.; and Reed, Robert L., 4,391,790, Cl. 423-574.00R.

Reichmann, Richard H.: *See*—
Campbell, Jay E.; Reichmann, Richard H.; and Lehmann, Li K., 4,391,402, Cl. 227-121.000.

Reinert, A. Joe, to Conoco Inc. Falling shot heating method and apparatus. 4,391,228, Cl. 122-28.000.

Reinhard, Max; and Kornmayer, Horst, to Colortronic Reinhard & Co. KG. Method and apparatus for metering particulate material. 4,391,140, Cl. 73-432.00R.

Reiser, Wolf: *See*—
Stetter, Jorg; Reiser, Wolf; and Faust, Wilfried, 4,391,626, Cl. 71-88.000.

Reiss, Garry K.: *See*—
Wood, Thomas D.; Reiss, Garry K.; and Overly, Larry L., 4,391,595, Cl. 474-33.000.

Reiter, Rudolf. Cone crusher. 4,391,414, Cl. 241-213.000.

Reitz, Gunther; Jakobs, Karlhans; and Boehmke, Gunther, to Bayer Aktiengesellschaft. Sulphonated mono-hydric diaryl phenol formaldehyde condensates, their preparation, their use as dispersing agents and formulations containing them. 4,391,718, Cl. 252-8.700.

Rempfler, Hermann; and Bohner, Beat, to Ciba-Geigy Corporation. 2-[4-(6-Haloquinoxalinyl-2-oxy)phenoxy]propionic acid esters. 4,391,628, Cl. 71-92.000.

Renaudin, Jean-Pierre: *See*—
Lecron, Jacques; Manera, Maxime; Faure, Jean-Paul; and Renaudin, Jean-Pierre, 4,391,618, Cl. 65-1.000.

Renfrew, Andrew H. M., to Imperial Chemical Industries PLC. Anthraquinone compounds. 4,391,754, Cl. 260-380.000.

Rengstorff, Roy H. Spectacle frame. 4,391,498, Cl. 351-121.000.

Reph, Arthur C., to Ingersoll-Rand Company. Column insert bearing housing. 4,391,475, Cl. 384-226.000.

Republic Steel Corporation: *See*—
Shepard, George A.; and Schillawski, Philip C., 4,391,685, Cl. 204-145.00R.
Velmin, Rolf; Kovatch, Michael S.; and Mautz, Gus H., Jr., 4,391,674, Cl. 201-41.000.

Reuter, Gerhard: *See*—
Serbent, Harry; Schlebusch, Detlev; Reuter, Gerhard; and Schnabel, Wolfram, 4,391,583, Cl. 432-4.000.

Rey, Thomas J. Electro-acoustic flowmeter. 4,391,150, Cl. 73-861.290.

Reynolds Metals Company: *See*—
Thurston, Michael E.; Cassada, William A., III; and Schardein, Daniel J., 4,391,655, Cl. 148-20.600.

Rheinmetall GmbH: *See*—
Koine, Richard, 4,391,180, Cl. 89-129.00R.

Rhone-Poulenc Agrochimie: *See*—
Boxler, Dena L.; and Chen, Albert C., 4,391,823, Cl. 424-306.000.
Fahmy, Mohamed A., 4,391,760, Cl. 260-961.000.

Rice, Dennis A., to Deere & Company. Cover plate for access opening. 4,391,065, Cl. 49-465.000.

Richards, Jack L.: *See*—
Maier, Thomas O.; and Richards, Jack L., 4,391,896, Cl. 430-223.000.

Ricoh Company, Ltd.: *See*—
Koide, Hiroshi, 4,391,506, Cl. 355-8.000.
Mori, Goro; and Ogura, Masaki, 4,391,507, Cl. 355-14.00R.
Shibusawa, Mitsuo; and Ogawa, Toshiyuki, 4,391,508, Cl. 355-14.0CU.

Rieger, Franz: *See*—
Linder, Ernst; Maurer, Helmut; Muller, Klaus; and Rieger, Franz, 4,391,691, Cl. 204-408.000.

Riel, Klaus: *See*—
Jaggle, Gunther; Peters, Klaus-Jurgen; and Riel, Klaus, 4,391,252, Cl. 123-454.000.

Rieland, Ronald L. Scaffold safety pin. 4,391,348, Cl. 182-119.000.

Riesuberger, Klaus: *See*—
Theurer, Josef; Hansmann, Johann; and Riesuberger, Klaus, 4,391,134, Cl. 73-146.000.

Rijckaert, Albert M. A.; de Niet, Edmond; and Beun, Jacobus P., to U.S. Philips Corporation. Magnetic tape recording and/or reproducing apparatus with automatic head positioning. 4,392,163, Cl. 360-76.000.

Riley, Eric K.; Smith, Colin D.; Yates, Garry J.; and Shepherd, Norris W., to Air Products and Chemicals, Inc. Method of operating a continuous ceramic kiln. 4,391,585, Cl. 432-23.000.

Riley, Wayne C.: *See*—
Wicke, Charles A.; and Riley, Wayne C., 4,391,459, Cl. 285-238.000.

Rinehart, James K.; Willis, Donald H.; and Luz, David W., to RCA Corporation. Remote responsive television receiver ferroresonant power supply. 4,392,090, Cl. 315-411.000.

Risman, Per O., to P.O.R. Microtrans AB. Dielectric heating applicator. 4,392,039, Cl. 219-10.55A.

Ritchey, Charles R.: *See*—
Mason, Arthur D., Jr.; Johnson, Avery A., Jr.; and Ritchey, Charles R., 4,391,799, Cl. 424-132.000.

RM Industrial Products Company, Inc.: *See*—
Jo, Byeong H.; and Zucker, Jerry, 4,391,875, Cl. 428-378.000.

Roach, Donald E., II, to Berwind Corporation. Rotating paddle bin level indicator. 4,392,032, Cl. 200-61.210.

Robaldo, Aldo M. Syringe for applying adhesive resin to the junctions of tennis racket netting. 4,391,391, Cl. 222-478.000.

Robert Bosch GmbH: *See*—
Eheim, Franz, 4,391,257, Cl. 123-503.000.
Jaggle, Gunther; Peters, Klaus-Jurgen; and Riel, Klaus, 4,391,252, Cl. 123-454.000.
Latsch, Reinhard, 4,391,248, Cl. 123-425.000.
Linder, Ernst; Maurer, Helmut; Muller, Klaus; and Rieger, Franz, 4,391,691, Cl. 204-408.000.
Paule, Kurt; Schadlich, Fritz; Gerschner, Martin; and Hornung, Friedrich, 4,392,093, Cl. 318-245.000.
Schleupen, Richard, 4,391,262, Cl. 123-618.000.
van Zanten, Anton, 4,391,126, Cl. 73-35.000.

Roberts, Frederick J., Jr.: *See*—
Prest, William M., Jr.; and Roberts, Frederick J., Jr., 4,391,537, Cl. 400-144.200.

Roberts, Richard D.; and Hoffman, Lester J., to Westinghouse Electric Corp. Vehicle propulsion control apparatus and method. 4,392,091, Cl. 318-52.000.

Roberts, Victor C.: *See*—
Sainz, Antonio J.; and Roberts, Victor C., 4,391,148, Cl. 73-861.250.

Robertshaw Controls Company: *See*—
Payne, Frank, 4,392,034, Cl. 200-81.400.

Robertson, Kem B.: *See*—
Pruett, Edwin C.; Robertson, Kem B.; and Loughead, Tomas E., 4,391,423, Cl. 244-161.000.

Robinson, John W.: *See*—
Kaganowicz, Grzegorz; and Robinson, John W., 4,391,843, Cl. 427-41.000.

Robinson, Mark L.: *See*—
Kelly, Thomas J.; and Robinson, Mark L., 4,391,634, Cl. 75-124.000.

Rockwell International Corporation: *See*—
Hallford, Ben R., 4,392,250, Cl. 455-327.000.
Hallford, Ben R., 4,392,251, Cl. 455-327.000.
Sutherland, Ray; and Wood, Mark S., 4,391,139, Cl. 73-273.000.

Rodine Limited: *See*—
Ruxton, David S.; and Stewart, Alex D., 4,392,095, Cl. 318-254.000.

Rogers, Jack S.; and Sanders, Kenneth H., to Milliken Research Corporation. Meat packaging shroud. 4,391,871, Cl. 428-219.000.

Rogers, Ronald A.; Wright, Ansel J.; and Wright, William H., to Master Addresser Company. Method for addressing cards and envelopes. 4,391,194, Cl. 101-471.000.

Rohatgi, Naresh K.: *See*—
Kalvinskas, John J.; and Rohatgi, Naresh K., 4,391,609, Cl. 44-1.0SR.

Rohm and Haas Company: *See*—
Memon, Nazir A.; and Myers, Cielo S., 4,391,938, Cl. 524-270.000.

Rolls-Royce Limited: *See*—
Goddard, John, 4,391,684, Cl. 204-129.400.
Speak, Trevor H., 4,391,565, Cl. 415-189.000.

Romero, Eduardo: *See*—
Rotolico, Anthony J.; Romero, Eduardo; and Lyons, John E., 4,391,860, Cl. 427-423.000.

Rosel, Hans-Dieter, to J. S. Staedtler KG. Apparatus for supplying and regulating a writing medium to the writing unit of a writing or drawing machine. 4,392,147, Cl. 346-140.00R.

Rosemount Inc.: *See*—
Grindheim, Earl A., 4,391,146, Cl. 73-718.000.

Rosemount Office Systems, Inc.: *See*—
Mollenkopf, Lloyd C.; and Branson, Daniel J., 4,391,073, Cl. 52-241.000.

Rosenbaum, Georges; Grollier, Jean F.; and Cotteret, Jean, to L'Oreal. Hydroxyl derivatives of benzaldehyde for coloring keratin fibres in the absence of oxidizing agent. 4,391,603, Cl. 8-424.000.

Rosenberg, Harry: *See*—
Weirich, Walter; Dettmers, Michael; Becker, Kunibert; and Rosenberg, Harry, 4,391,181, Cl. 91-29.000.

Rosenberry, George M., to General Electric Company. Dynamoelectric machine stator having articulated amorphous metal components. 4,392,072, Cl. 310-216.000.

Rosenberry, George M., Jr., to General Electric Company. Dynamoelectric machine stator having concentric amorphous metal laminations and method of making same. 4,392,073, Cl. 310-216.000.

Rosenthal, Joel W., to Chevron Research Company. Coal liquefaction process. 4,391,699, Cl. 208-8.0LE.

Rosinski, Edward J.; and Rubin, Mae K., to Mobil Oil Corporation. Preparation of ZSM-12 type zeolites. 4,391,785, Cl. 423-329.000.

Rostoker, Norman, to Maxwell Laboratories, Inc. Method and apparatus for accelerating charged particles. 4,392,111, Cl. 328-237.000.

Roth, Ronald H.: *See*—
Monfredo, Joseph R.; and Roth, Ronald H., 4,391,589, Cl. 433-63.000.

Rothenberg, Allan: *See*—
Tyler, Truman V.; and Sprague, Robert B., 4,391,712, Cl. 210-652.000.

Rotolico, Anthony J.; Romero, Eduardo; and Lyons, John E., to Eutectic Corporation. Device for the controlled feeding of powder material. 4,391,860, Cl. 427-423.000.

Roussel, Philippe: *See*—
Fankhauser, Franz; van der Zypen, Eugen; and Roussel, Philippe, 4,391,275, Cl. 128-303.100.

Rowden, George A.: *See*—
Jackson, Ian D.; Berry, Derek; Rowden, George A.; and Dilley, Malcolm, 4,391,711, Cl. 210-634.000.

Rowell, John M.: *See*—
Feldmann, William L.; Rowell, John M.; and Schmidt, Paul H., 4,391,657, Cl. 148-133.000.

Rozmus, Walter J., to Kelsey-Hayes Company. Method and apparatus for preventing lubricant flow from a vacuum source to a vacuum chamber. 4,391,614, Cl. 55-2.000.

Rubin, Mae K.: *See*—
Rosinski, Edward J.; and Rubin, Mae K., 4,391,785, Cl. 423-329.000.

Rubin, Michael D., to Ford Aerospace & Communications Corporation. Circuit for reducing voltage stress across a transformer. 4,392,173, Cl. 361-35.000.

RUD-Kettenfabrik Rieger & Dietz GmbH u. Co.: *See*—
Weidler, Erhard A., 4,391,313, Cl. 152-171.000.

Rudgard, Ingemar: *See*—
Lundstrom, Jan-Erik; and Rudgard, Ingemar, 4,392,130, Cl. 340-747.000.

Ruetz, Gottfried: *See*—
Polzer, Erich; Ruetz, Gottfried; Schmolz, Hubert; and Pochon, Remy, 4,391,096, Cl. 60-335.000.

Rule, Mark: *See*—
Hook, Richard J.; and Rule, Mark, 4,391,985, Cl. 562-414.000.

Runnels, Robert W.; Wagenaar, Loren B.; Luke, Louis E.; and Bresnahan, Thomas P., to Westinghouse Electric Corp. Condenser-type electrical bushing with central electrode aligning wedging blocks. 4,392,015, Cl. 174-143.000.

Runsten, Bengt W., to AB Europa Film. Apparatus in electro deposition plants, particularly for use in making master phonograph records. 4,391,694, Cl. 204-273.000.

Ruoslahti, Erkki I.: *See*—
Engvall, Eva S.; and Ruoslahti, Erkki I., 4,391,749, Cl. 260-123.700.

Rupprecht, Georg: *See*—
Patashnick, Harvey; and Rupprecht, Georg, 4,391,338, Cl. 177-210.0FP.

Russell, Jerry E. Mechanical remote control device for a television receiver. 4,392,256, Cl. 455-354.000.

Ruszala, Ferdinand A., to Ashland Oil, Inc. Oxydehydrogenation of isobutyric acid and its lower alkyl esters. 4,391,990, Cl. 562-599.000.

Rutter, Henry A., to National Hydro-Hoist Company. Gunnel support system for use with a boat lift. 4,391,550, Cl. 405-7.000.

Ruxton, David S.; and Stewart, Alex D., to Rodine Limited. Method of and apparatus for generating a unique index mark from the commutation signal of a D.C. brushless motor. 4,392,095, Cl. 318-254.000.

Ryckaert, Andre'; and Servais, Michel, to Solvay & Cie. Stabilized compositions of chlorinated solvents. 4,392,000, Cl. 570-104.000.

Ryobi Ltd.: *See*—
Ishii, Koji; Shinmoto, Takahiko; and Maehara, Kenso, 4,391,193, Cl. 101-415.100.

Rys-Sikora, John, to Du Pont de Nemours, E. I., and Company. Low density closed-cell foamed articles from ethylene copolymer/vinyl or vinylidene halide blends. 4,391,923, Cl. 521-96.000.

S. C. Johnson & Son, Inc.: *See*—
van Lit, Klaas J., 4,391,781, Cl. 422-125.000.

Saab-Scania Aktiebolag: *See*—
Claesson, Dick V., 4,391,258, Cl. 123-508.000.

Saar, David A.; and Walter, Richard T., to Black & Decker Inc. Method of charging batteries and apparatus therefor. 4,392,101, Cl. 320-20.000.

Sach-Systemtechnik GmbH: *See*—
Lutz, Dieter, 4,392,134, Cl. 340-825.310.

Sachs- Systemtechnik GmbH: *See*—
Lutz, Dieter, 4,391,048, Cl. 36-28.000.

Saeki, Shinichi: *See*—
Tamamura, Junichi; Yasuda, Mamoru; Hosoda, Motomi; and Saeki, Shinichi, 4,392,025, Cl. 179-111.00R.

Safekeeper Systems, Inc.: *See*—
Mitchell, Ernst K.; and Terry, Richard H., 4,391,204, Cl. 109-39.000.

Sagawa, Akio: *See*—
Suzuki, Masayoshi; and Sagawa, Akio, 4,392,069, Cl. 307-252.00A.

Saino, Tetsushi: *See*—
Umezawa, Hamao; Aoyagi, Takaaki; Shirai, Tadashi; Nishizawa, Rinzo; Suzuki, Masao; and Saino, Tetsushi, 4,391,986, Cl. 562-444.000.

St. Clair, David J., to Shell Oil Company. Asymmetric block copolymers and corresponding adhesive formulations. 4,391,949, Cl. 525-99.000.

Sainz, Antonio J.; and Roberts, Victor C., to National Research Development Corporation. Methods and apparatus for measuring the cross-sectional area of a duct and the volume flow rate of fluid in the duct. 4,391,148, Cl. 73-861.250.

Saito, Junichi: *See*—
Aya, Masahiro; Saito, Junichi; Yasui, Kazuomi; Kakabu, Shinzo; Kamochi, Atsumi; and Yamaguchi, Naoko, 4,391,629, Cl. 71-94.000.

Saito, Koichi; and Ohara, Osamu, to Kuraray Company, Limited. Aqueous dispersion type coating compositions with an improved vibration-damping characteristic. 4,391,857, Cl. 427-385.500.

Saji, Hideo: *See*—
Kobashi, Mamoru; Tanaka, Shinichiro; and Saji, Hideo, 4,391,244, Cl. 123-339.000.

Sakai, Kiyoshi: *See*—
Mabuchi, Minoru; Sakai, Kiyoshi; Ishikawa, Shozo; Egashira, Yuji; and Kitahara, Makoto, 4,391,889, Cl. 430-59.000.

Sakai, Masaru: *See*—
Kawamura, Teruaki; Harada, Nobuhiko; Komatsu, Yukihiko; and Sakai, Masaru, 4,391,016, Cl. 15-302.000.

Sakai, Sigeo: *See*—
Shimizu, Hiroshi; Sakai, Sigeo; Matsuda, Fumihiko; and Matsumoto, Reiko, 4,391,649, Cl. 127-46.200.

Sakharov, Viktor P.: *See*—
Pasmannik, Vitaly I.; and Sakharov, Viktor P., 4,392,079, Cl. 315-5.390.

Sakraida, Gerard J., Jr. Log splitting head. 4,391,312, Cl. 144-193.00E.

Sakuraba, Yasuya: *See*—
Takematsu, Tetsuo; Isogawa, Takayuki; and Sakuraba, Yasuya, 4,391,631, Cl. 71-118.000.

Salsky, Jerome; Janis, Patrick K.; and Branen, Kenneth E., to United States Tennis Gut Association, Inc. String for sports rackets. 4,391,088, Cl. 57-234.000.

Salvagnini, Guido, to Salvagnini Transferica S.p.A. Automatic punching machine. 4,391,123, Cl. 72-464.000.

Salvagnini Transferica S.p.A.: *See*—
Salvagnini, Guido, 4,391,123, Cl. 72-464.000.

Sand and Sea Corporation: *See*—
Deer, Carmine A.; and Cacossa, Frank G., 4,391,647, Cl. 106-115.000.

Sanders, Kenneth H.: *See*—
Rogers, Jack S.; and Sanders, Kenneth H., 4,391,871, Cl. 428-219.000.

Sandstrom, Donald R.; and Lytle, Farrel W., to Guardsman Chemicals, Inc. System and method of migratory animal identification by fluorescence spectroscopy of element coded implanted tags, and tags used therein. 4,392,236, Cl. 378-045.000.

Sansone, Eugene A., to Singer Company, The. Self compensating optoelectronic ply and edge detector for sewing machine. 4,391,215, Cl. 112-275.000.

Sarcia, Domenico S., to CVI Incorporated. Fluidic cryogenic refrigerator. 4,391,103, Cl. 62-6.000.

Saruwatari, Shigeto, to Matsushita Electric Industrial Co., Ltd. Battery connecting device. 4,391,882, Cl. 429-96.000.

Sasaki, Kouji: *See*—
Kuwabara, Kouji; Sugawara, Hiroyuki; Shirakura, Toshiharu; Sasaki, Kouji; and Takemori, Satoshi, 4,391,519, Cl. 356-153.000.

Sassano, Daniel R., to Westinghouse Electric Corp. Low viscosity polyester coating compositions. 4,391,947, Cl. 525-11.000.

Sato, Takeshi; and Suzaki, Shunichi, to Kabushiki Kaisha Nichidenshi Technics. Method and apparatus for compensating for astigmatism in electron beam devices. 4,392,054, Cl. 250-307.000.

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Schleupen, Richard, to Robert Bosch GmbH. Ignition system for an internal combustion engine. 4,391,262, Cl. 123-618.000.
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Kramer, Wilhelm, 4,391,664, Cl. 156-71.000.
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Schmitz, Peter. Apparatus for cutting swivel-bending and press-bending sheet metal and similar materials. 4,391,119, Cl. 72-384.000.
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Schwartz, Ellen S.; Tincher, Cline A.; and Maxwell, Jerrold F., to BASF Wyandotte Corporation. Water-based low foam hydraulic fluid employing 2-ethylhexanol defoamer. 4,391,722, Cl. 252-73.000.
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Scott Paper Company: *See*—
Drach, John E., 4,391,878, Cl. 428-479.600.
Scott, Steven W., to General Electric Company. Thermoplastic molding composition. 4,391,954, Cl. 525-439.000.
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Secon, Edward, to Sherwood Corporation, The. Shelving console furniture. 4,391,378, Cl. 211-187.000.
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Seggio, Gianfranco. Anti-skid device for vehicle wheels. 4,391,316, Cl. 152-213.00A.
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Williamson, Richard D.; and Selinko, George J., 4,391,883, Cl. 429-97.000.

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Shann, Peter C. Detonation of explosive charges and equipment therefor. 4,391,195, Cl. 102-201.000.
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Shepherd, Norris W.: *See—*
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Iso, Yoshimi; Inoue, Shigeki; and Shibuya, Toshifumi, 4,392,020, Cl. 179-1.0GE.
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Shimazu, Ken-ichi; and Deutsch, Albert, to Polychrome Corporation. Colored photosensitive composition. 4,391,894, Cl. 430-154.000.
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Murakami, Shinichi; Morichika, Toshiaki; Hiraishi, Hisashi; and Shiokawa, Hiroyuki, 4,391,635, Cl. 75-125.000.
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Shotbolt, Keith, to Constructors John Brown Limited. Guides for use in forming pipe connections and a process of forming pipe connections. 4,391,331, Cl. 166-342.000.
Sieffert, William G., to Champion International Corporation. Fiberboard shipping container having laminated spacing members. 4,391,371, Cl. 206-597.000.
Siegmund, Walter P., to American Optical Corporation. Method of making lenses having a spherical face. 4,391,621, Cl. 65-31.000.
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Edinger, Egon; and Kohler, Gerd, 4,391,764, Cl. 264-25.000.
Keller, Wolfgang; Grassmann, Hans-Christian; and Schmidt, Karl, 4,392,230, Cl. 373-139.000.
Kleinschmidt, Peter; and Magori, Valentin, 4,392,074, Cl. 310-327.000.
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Walter, Karl-Heinz, 4,392,131, Cl. 340-803.000.
Wilkens, Achim, 4,392,239, Cl. 378-146.000.
Silberring, Ludwig. Process and apparatus for hydrogen production. 4,391,794, Cl. 423-650.000.
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Billon, Alain; Le Page, Jean-Francois; Peries, Jean-Pierre; and Simandoux, Jean-Claude, 4,391,700, Cl. 208-86.000.
Simjian, Luther G. Exercise apparatus. 4,391,441, Cl. 272-126.000.
Simmons, Nathaniel; Magnusson, Stig; Puccini, Sergio E.; McLaughlin, Donald W.; and Stelte, David J., to GTE Automatic Electric Laboratories, Inc. Dual rail time and control unit for a T-S-T-digital switching system. 4,392,223, Cl. 370-63.000.
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Skinner, Stuart M., Jr.: *See—*
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Skiver, Bruce W.: *See—*
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Petersen, Olfert H., 4,391,141, Cl. 73-433.000.
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Small, Augustus B.; Hughes, Vincent L.; and Benitez, Francisco M., to Exxon Research & Engineering Co. Process for preparing light colored petroleum resins and resins produced thereby (CS-203). 4,391,961, Cl. 526-76.000.
Smeets, Gerard G. F. Punch press machine with adjustable tool positioning. 4,391,174, Cl. 83-552.000.
Smith, Alfred A. Transfer bench. 4,391,006, Cl. 4-559.000.
Smith, Allan L. Sprinkler with transversely mounted splash plate. 4,391,410, Cl. 239-498.000.
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Smith, Derrick A. Closed loop hermetically sealed solar power generator. 4,391,100, Cl. 60-641.110.
Smith, Donald A.; and Pote, Bruce M., to Combustion Engineering, Inc. Solids pumping apparatus. 4,391,561, Cl. 414-218.000.
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Smith, Graham C.: *See*—
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Smith, Jeremy G. B., to AECI Limited. Explosive. 4,391,659, Cl. 149-2.000.
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Dupain, Jean, 4,391,774, Cl. 422-63.000.
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Barkats, Gerard; Girard, Alain; Marchal, Jean; and Morel, Charles, 4,392,007, Cl. 136-248.000.
Societe Navale Chargeurs Delmas-Vieljeux: *See*—
Loreal, Guy, 4,391,462, Cl. 292-207.000.
Societe Nouvelle de Bouchons Plastiques S.N.B.P.: *See*—
Babiol, Pierre, 4,391,383, Cl. 215-256.000.
Societe Prl: *See*—
Carter, Brian, 4,392,048, Cl. 219-367.000.
Societe Vetrotex Saint-Gobain: *See*—
Lecron, Jacques; Manera, Maxime; Faure, Jean-Paul; and Renaudin, Jean-Pierre, 4,391,618, Cl. 65-1.000.
Sodex-Magister, Societe d'Exploitation: *See*—
Neyret, Guy, 4,391,112, Cl. 70-364.00A.
Solar Dynamics Inc.: *See*—
Mathes, Donovan B.; Hamilton, Floyd B.; and Spreng, Douglas C., 4,391,268, Cl. 126-437.000.
Solarex Corporation: *See*—
Lindmayer, Joseph, 4,392,010, Cl. 136-256.000.
Solid Photography, Inc.: *See*—
Di Matteo, Paul, 4,392,182, Cl. 362-5.000.
Solid State Systems, Inc.: *See*—
Mehaffey, Joseph H.; and Szlam, Aleksander, 4,392,129, Cl. 340-765.000.
Solvay & Cie.: *See*—
Ryckaert, Andre'; and Servais, Michel, 4,392,000, Cl. 570-104.000.
Somerville, Ronald: *See*—
Pickens, Robert C., Jr.; Thomas, Reese R.; and Somerville, Ronald, 4,391,866, Cl. 428-92.000.
Sone, Norio: *See*—
Kogoma, Kiyoshi; Ohashi, Yu; Niizeki, Jiro; Sone, Norio; and Tobita, Takashi, 4,391,994, Cl. 568-593.000.
Sony Corporation: *See*—
Yamada, Takaaki; Osakabe, Yoshio; and Tsuda, Yukio, 4,392,253, Cl. 455-165.000.
Yamamoto, Kaichi, 4,392,162, Cl. 360-10.300.
Sorensen, Jens O. Atmospheric thermal energy conversion utilizing inflatable pressurized rising conduit. 4,391,099, Cl. 60-641.600.
Souques, Georges: *See*—
Cadet, Christian; Dumortier, Bernard; and Souques, Georges, 4,392,174, Cl. 361-45.000.
Sparks, Jacob D. Springless nipple waterer valve. 4,391,225, Cl. 119-72.500.
Spaziante, Placido M.; and Giuffre, Luigi. Process for methyl isocyanate production. 4,391,758, Cl. 260-453.00P.
Speak, Trevor H., to Rolls-Royce Limited. Nozzle guide vane assemblies for turbomachines. 4,391,565, Cl. 415-189.000.
Speicher, John M.: *See*—
Bastian, Thomas W.; and Speicher, John M., 4,392,140, Cl. 343-765.000.
Spells, Sherwood: *See*—
Lee, Chi-long; and Spells, Sherwood, 4,391,765, Cl. 264-26.000.
Sperry Corporation: *See*—
Waldrop, T. William, 4,391,363, Cl. 198-865.000.
Young, Terry A.; and Mast, Aquila D., 4,391,364, Cl. 198-865.000.
Spindler, Manfred; Tanner, Herbert; Geiger, Friedhelm; Bittner, Friedrich; and Martens, Jurgen, to Degussa Aktiengesellschaft. Process for the production of aqueous sodium methioninate solutions. 4,391,987, Cl. 562-559.000.
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Spinelli, Louis A., to Nabisco Brands, Inc. Speed controlled infeed conveyor system. 4,391,362, Cl. 198-855.000.
Spitz, Robert J.: *See*—
Cordova, Samuel; and Spitz, Robert J., 4,391,059, Cl. 43-15.000.
Spradlin, Joseph E.; Morgan, Jeffrey D.; Olson, Allan R.; and Howley, Joseph P., to General Foods Corporation. Dual enzyme digestion for a dog food of improved palatability. 4,391,829, Cl. 426-28.000.
Sprague, Robert B.: *See*—
Tyler, Truman V.; and Sprague, Robert B., 4,391,712, Cl. 210-652.000.
Sprecker, Mark A.; Hanna, Marie R.; Tokarzewski, Richard J.; Belko, Robert P.; Watkins, Hugh; and Vock, Manfred H., to International Flavors & Fragrances Inc. Use in modifying smoking tobacco aroma and flavor or mono-oxomethyl substituted polyhydrodimethanonaphthalene derivatives. 4,391,284, Cl. 131-276.000.
Spreng, Douglas C.: *See*—
Mathes, Donovan B.; Hamilton, Floyd B.; and Spreng, Douglas C., 4,391,268, Cl. 126-437.000.
Spring, Kurt: *See*—
Dreier, Ernst; and Spring, Kurt, 4,391,213, Cl. 112-246.000.
Springs, Daniel R.: *See*—
Goss, David C.; and Springs, Daniel R., 4,392,051, Cl. 219-528.000.
SPS Technologies, Inc.: *See*—
Cadwallader, James W., 4,391,544, Cl. 403-155.000.
SRI International: *See*—
Green, Philip S., 4,391,281, Cl. 128-660.000.
Staempfli, Jackie, to Tulcea, S.A. Disposable syringe. 4,391,272, Cl. 604-110.000.
Staerzl, Richard E., to Brunswick Corporation. Atomization compensation for electronic fuel injection. 4,391,254, Cl. 123-478.000.
Staerzl, Richard E., to Brunswick Corporation. Programmed sequential fuel injection in an internal combustion engine. 4,391,255, Cl. 123-481.000.
Stahl, Edward L.; and Kreeger, Elsmer W., to Pinckney Molded Plastics, Inc. Four-level stacking container. 4,391,369, Cl. 206-506.000.
Stamicarbon, B.V.: *See*—
Don, Johannes A.; and Scholten, Joseph J. F., 4,392,001, Cl. 585-269.000.
Stamminger, Reinhard: *See*—
Cullis, Herbert M; and Stamminger, Reinhard, 4,392,008, Cl. 136-248.000.
Standard Change-Makers, Inc.: *See*—
Bayne, Robert T.; and Shireman, Phillip E., 4,391,387, Cl. 221-13.000.
Standard Oil Company, The: *See*—
Kuch, Philip L.; Herrington, Daniel R.; and Eggett, Janet M., 4,391,756, Cl. 260-430.000.
Standard Oil Company (Indiana): *See*—
Ferreira, Laurence E.; Lamar, Richard S.; and Bertolacini, Ralph J., 4,391,734, Cl. 252-378.00R.
Lamar, Richard S.; Ferreira, Laurence E.; and Cloud, Robert C., 4,391,733, Cl. 252-378.00R.
Nimry, Tayseer S.; and Fields, Ellis K., 4,391,967, Cl. 528-189.000.
Palm, John W.; and Reed, Robert L., 4,391,790, Cl. 423-574.00R.
Palm, John W.; and Mungen, Richard, 4,391,791, Cl. 423-574.00R.
Pappas, Peter G., 4,391,721, Cl. 252-51.50A.
Stanley, Robert C., to FMC Corporation. System for controlling a juice extraction facility. 4,391,185, Cl. 99-489.000.
Stanton, Howard F.: *See*—
Keathley, Anthony C.; Stanton, Howard F.; and Wagle, Mahesh M., 4,391,114, Cl. 72-78.000.
Stanton, William E.; Eisenhaure, David B.; and Drescher, Robert D., to Charles Stark Draper Laboratory, Inc., The. Optimum efficiency control system. 4,392,100, Cl. 318-803.000.
Stapleton, Brian P.: *See*—
Aoyama, Frank S.; and Stapleton, Brian P., 4,392,139, Cl. 343-705.000.
Steadman, Rufus P. Lamp standard assembly. 4,392,192, Cl. 362-418.000.
Steele, Derek E. Moisture meters of a type especially suitable for estimating the moisture content of organic materials. 4,392,127, Cl. 340-604.000.
Steigerwald, Wolf-Erhard; Ambros, Peter; and Gatzke, Erich. Paste composition for the production of electrically conductive and solderable structures. 4,391,742, Cl. 252-512.000.

Steigmeier, Edgar F.; and Auderset, Heinrich, to RCA Corporation. Method for determining the quality of light scattering material. 4,391,524, Cl. 356-338.000.

Stein, Israel M., to Clinical Data, Inc. Electrode belt. 4,391,279, Cl. 128-643.000.

Steiner Corporation: *See*—
Steiner, Robert L., 4,391,308, Cl. 141-18.000.
Steiner, Robert L., 4,391,309, Cl. 141-18.000.

Steiner, Robert L., to Steiner Corporation. Soap dispensing system. 4,391,308, Cl. 141-18.000.

Steiner, Robert L., to Steiner Corporation. Soap dispensing system. 4,391,309, Cl. 141-18.000.

Steinkraus, Richard W. Filter element sealing device for filter pan. 4,391,706, Cl. 210-232.000.

Stelte, David J.: *See*—
Simmons, Nathaniel; Magnusson, Stig; Puccini, Sergio E.; McLaughlin, Donald W.; and Stelte, David J., 4,392,223, Cl. 370-63.000.

Sterling Drug Inc.: *See*—
Coates, Colin F., 4,391,715, Cl. 210-696.000.
Lesher, George Y.; Opalka, Chester J., Jr.; and Page, Donald F., 4,391,811, Cl. 424-263.000.
Lewis, Frederick M., 4,391,208, Cl. 110-346.000.

Stetter, Jorg; Reiser, Wolf; and Faust, Wilfried, to Bayer Aktiengesellschaft. Alcalkylamide compounds and herbicidal antidote compositions. 4,391,626, Cl. 71-88.000.

Stevenson, John; Cross, Alan; and Anderson, John G., to Foseco International Limited. Alkali metal silicate binder compositions. 4,391,642, Cl. 106-38.230.

Stewart, Alex D.: *See*—
Ruxton, David S.; and Stewart, Alex D., 4,392,095, Cl. 318-254.000.

Stichnoth, Andreas: *See*—
Stichnoth, Otto; and Stichnoth, Andreas, 4,391,602, Cl. 8-149.100.

Stichnoth, Otto; and Stichnoth, Andreas. Process for smoothing and drying washed shaped articles of mixed fabric. 4,391,602, Cl. 8-149.100.

Stiglich, Ralph E., to Honeywell Inc. Electronic circuit for eliminating chatter. 4,392,065, Cl. 307-247.00A.

Stimson, John J., Jr.: *See*—
Harris, Robert H.; Humphrey, Troy G.; and Stimson, John J., Jr., 4,391,085, Cl. 56-330.000.

Stipe, Lester E., to Precision Plumbing Products, Inc. Hot water system and valve. 4,391,295, Cl. 137-522.000.

Stolte, Friedrich: *See*—
Icking, Friedrich; and Stolte, Friedrich, 4,391,222, Cl. 119-14.170.

Stork Screens, B.V.: *See*—
van der Velden, Hendricus J., 4,391,898, Cl. 430-306.000.

Strauss, Georg: *See*—
Kersting, Hans-Joachim; Wolfrum, Erhard; Portz, Willi; and Strauss, Georg, 4,391,786, Cl. 423-442.000.

Strelisky, Janos: *See*—
Korbonits, Dezso; Nogradi, Mihaly; Vermes nee Szluha, Borbala; Strelisky, Janos; Wolfner, Andras; Heja, Gergely; Kovacz, Gabor; Szegi, Jozsef; and Virag, Sandor, 4,391,821, Cl. 424-283.000.

Struck, Bernd D.; Junginger, Robert; and Boltersdorf, Dagmar, to Kernforschungsanlage Julich GmbH. Method for electrolytic production of hydrogen. 4,391,682, Cl. 204-104.000.

Stuby, Kenneth P., to International Business Machines Corporation. Thermally compensated shadow mask. 4,391,034, Cl. 29-579.000.

Studhalter, Walter R.; Amend, William E.; and Helgeson, Norman L., to Biphase Energy Systems. Fresh water production from power plant waste heat. 4,391,102, Cl. 60-649.000.

Stupirak, Wilhelm: *See*—
Greive, Aloys; Horstmann, Aloys; and Stupirak, Wilhelm, 4,391,087, Cl. 57-58.520.

Stutzman, Clarence. Apparatus for cooling a ceiling mounted fan motor. 4,391,570, Cl. 417-353.000.

Sublistatic Holding, S.A.: *See*—
Hendriks, Dieter, 4,391,893, Cl. 430-137.000.

Such, Mihaly: *See*—
Devenyi, Tibor; Bocsa, Klara K.; Kovats, Ferenc; Pongor, Sandor; Szabolcsi, Gertrud; and Such, Mihaly, 4,391,839, Cl. 426-626.000.

Suda, Tatsuo; Hirasawa, Yoshihei; Takahashi, Sachio; Abe, Etsuko; Konno, Kunio; and Aoki, Tadao, to Chugai Seiyaku Kabushiki Kaisha. Method of treating leukemia or leukemoid diseases. 4,391,802, Cl. 424-236.000.

Sugalski, Raymond K.; and Blake, Charles R., to General Electric Company. Liquid crystal indicator. 4,392,102, Cl. 320-48.000.

Sugasawa, Fukashi; and Iizuka, Haruhiko, to Nissan Motor Company, Limited. Internal combustion engine. 4,391,240, Cl. 123-198.00F.

Sugawara, Hiroyuki: *See*—
Kuwabara, Kouji; Sugawara, Hiroyuki; Shirakura, Toshiharu; Sasaki, Kouji; and Takemori, Satoshi, 4,391,519, Cl. 356-153.000.

Sugimoto, Hitoshi: *See*—
Abe, Yoshiaki; Kubota, Yutaka; and Sugimoto, Hitoshi, 4,391,237, Cl. 123-179.00H.

Sugino, Takashi: *See*—
Itoh, Kunio; Sugino, Takashi; Wada, Masaru; and Shimizu, Hirokazu, 4,392,227, Cl. 372-46.000.
Okabe, Takako; Itoh, Kunio; and Sugino, Takashi, 4,392,228, Cl. 372-46.000.

Sugisita, Kaneo: *See*—
Tsunoda, Sachio; and Sugisita, Kaneo, 4,391,097, Cl. 60-398.000.

Sullivan, Daniel T.: *See*—
Arulpragasam, Jega A.; Giggi, Robert A.; Lary, Richard F.; and Sullivan, Daniel T., 4,392,200, Cl. 364-200.000.

Sullivan, Thomas A.: *See*—
McBee, William C.; and Sullivan, Thomas A., 4,391,969, Cl. 528-389.000.

Sumitomo Electric Industries, Ltd.: *See*—
Horikawa, Takahiro; Hibino, Yutaka; and Maki, Seiichi, 4,391,218, Cl. 118-621.000.
Inamoto, Jiro; and Hayata, Nachiro, 4,391,314, Cl. 152-210.000.
Moriya, Michio, 4,391,350, Cl. 188-1.110.

Sumitomo Rubber Industries, Ltd.: *See*—
Inamoto, Jiro; and Hayata, Naohiro, 4,391,314, Cl. 152-210.000.

Sundaram, T. R.: *See*—
Johnson, Virgil E., Jr.; Sundaram, T. R.; and Conn, Andrew F., 4,391,339, Cl. 175-393.000.

Sunderland, Ned E. Cutting apparatus for cutting a non-circular opening. 4,391,042, Cl. 30-316.000.

Sundstrand Corporation: *See*—
Hunsberger, Dale L.; and Harwath, Frank L., 4,391,580, Cl. 431-1.000.

Sung, Rodney L.; Sweeney, William M.; and Crawford, Wheeler C., to Texaco Inc. Liquid hydrocarbon fuel containing a corrosion inhibitor, dialkoxylated alkyl polyoxyalkyl primary amine. 4,391,610, Cl. 44-56.000.

Sutco, Inc.: *See*—
Hollier, Joseph H., Jr., 4,391,415, Cl. 242-56.900.

Sutherland, Ray; and Wood, Mark S., to Rockwell International Corporation. Plastic water meter main case. 4,391,139, Cl. 73-273.000.

Suwaki, Toshitaka: *See*—
Ando, Otaro; and Suwaki, Toshitaka, 4,391,282, Cl. 128-660.000.

Suzaki, Shunichi: *See*—
Sato, Takeshi; and Suzaki, Shunichi, 4,392,054, Cl. 250-307.000.

Suzuki, Isamu: *See*—
Masamoto, Junzo; Hamada, Minoru; Suzuki, Isamu; and Yoshida, Takeo, 4,391,741, Cl. 252-511.000.

Suzuki, Koichi: *See*—
Kawai, Shinji; Suzuki, Koichi; and Yamaguchi, Yuji, 4,391,004, Cl. 4-443.000.

Suzuki, Masao: *See*—
Umezawa, Hamao; Aoyagi, Takaaki; Shirai, Tadashi; Nishizawa, Rinzo; Suzuki, Masao; and Saino, Tetsushi, 4,391,986, Cl. 562-444.000.

Suzuki, Masayoshi; and Sagawa, Akio, to Hitachi, Ltd. Semiconductor switch. 4,392,069, Cl. 307-252.00A.

Suzuki, Seiichi: *See*—
Ichikawa, Katsumi; Amano, Itaru; Ozaki, Keiji; and Suzuki, Seiichi, 4,391,769, Cl. 264-326.000.

Suzuki, Teruo, to Toppan Printing Co., Ltd. Method of making a half-tone gravure printing plate. 4,391,899, Cl. 430-307.000.

Suzuki, Togi; Tsunawaki, Kiyokazu; Wada, Osamu; and Kimura, Akio, to Teijin, Ltd. Hollow water-absorbing polyester filament textile material. 4,391,872, Cl. 428-224.000.

Suzuki, Yoshimi: *See*—
Shinoi, Tsuyoshi; Mochizuki, Keisuke; Suzuki, Yoshimi; Kudoh, Masaru; and Hashimoto, Wataru, 4,392,024, Cl. 179-99.00R.

Suzuki, Yoshiro: *See*—
Kamegaya, Takeo; Sekigawa, Tadahiko; Kurakami, Hiroshi; and Suzuki, Yoshiro, 4,392,075, Cl. 313-584.000.

Swan Corporation, The: *See*—
Moore, John W., 4,391,072, Cl. 52-211.000.

Sweeney, William M.: *See*—
Sung, Rodney L.; Sweeney, William M.; and Crawford, Wheeler C., 4,391,610, Cl. 44-56.000.

Swiss Aluminium Ltd.: *See*—
Brockmeyer, Jerry W., 4,391,918, Cl. 501-127.000.

Sybron Corporation: *See*—
Grunert, Hans C., 4,391,478, Cl. 312-320.000.

Sylvain, Daniel, to Clesid. Apparatus for storing a variable length of strip. 4,391,400, Cl. 226-113.000.

Sysak, Peter K., to Du Pont de Nemours, E. I., and Company. Ionic copolymers in photographic light-sensitive silver halide films. 4,391,903, Cl. 430-629.000.

Syva Company: *See*—
Litman, David J.; and Ullman, Edwin F., 4,391,904, Cl. 435-7.000.

Szabolcsi, Gertrud: *See*—
Devenyi, Tibor; Bocsa, Klara K.; Kovats, Ferenc; Pongor, Sandor; Szabolcsi, Gertrud; and Such, Mihaly, 4,391,839, Cl. 426-626.000.

Szegi, Jozsef: *See*—
Korbonits, Dezso; Nogradi, Mihaly; Vermes nee Szluha, Borbala; Strelisky, Janos; Wolfner, Andras; Heja, Gergely; Kovacz, Gabor; Szegi, Jozsef; and Virag, Sandor, 4,391,821, Cl. 424-283.000.

Szkolnik, Michael, to Cornell Research Foundation, Inc. Vapor phase fungicidal method. 4,391,813, Cl. 424-269.000.

Szlam, Aleksander: *See*—
Mehaffey, Joseph H.; and Szlam, Aleksander, 4,392,129, Cl. 340-765.000.

T. A. Systems, Inc.: *See*—
Taruntsev, V., 4,391,121, Cl. 72-406.000.

Tabuchi, Takeshi; and Abe, Matazo, to Takeda Chemical Industries, Ltd. Method for producing citric acids. 4,391,908, Cl. 435-144.000.

Taghon, Daniel, to Poclain. Supporting chassis for a working machine, such as a hydraulic shovel. 4,391,341, Cl. 180-9.20R.

Taguchi, Kenichi: *See*—
Ishihara, Toshinobu; Yamamoto, Akira; and Taguchi, Kenichi, 4,391,984, Cl. 560-236.000.

Tahara, Iwao: *See*—
Wakabayashi, Takuo, deceased; Wakabayashi, Shigemasa, legal representative; Tahara, Iwao; Aihara, Toshiharu; Takahashi, Naoki; and Matsuo, Yushin, 4,391,530, Cl. 368-63.000.

Tai, Wun T., to Nalco Chemical Company. Polycationic latices of dimethylaminopropyl-acrylamide, and their use of as sludge dewatering agents and/or paper retention aids. 4,391,932, Cl. 523-337.000.

Tajima, Akira; and Tsuji, Sadahiko, to Canon Kabushiki Kaisha. Method to increase focal distance at telephotographic side of a zoom lens system. 4,391,493, Cl. 350-422.000.

Takada, Masaniko: *See*—
Yamane, Kazumasa; Kobayashi, Masahiro; and Takada, Masaniko, 4,391,944, Cl. 524-548.000.

Takagi, Akinobu: *See*—
Kawabata, Etsuo; Ogura, Masahiko; Takagi, Akinobu; and Fujimura, Akira, 4,391,246, Cl. 123-391.000.

Takahashi, Naoki: *See*—
Wakabayashi, Takuo, deceased; Wakabayashi, Shigemasa, legal representative; Tahara, Iwao; Aihara, Toshiharu; Takahashi, Naoki; and Matsuo, Yushin, 4,391,530, Cl. 368-63.000.

Takahashi, Sachio: *See*—
Suda, Tatsuo; Hirasawa, Yoshihei; Takahashi, Sachio; Abe, Etsuko; Konno, Kunio; and Aoki, Tadao, 4,391,802, Cl. 424-236.000.

Takahashi, Takao, to Nissan Motor Co., Ltd. Weft picking device of air jet type weaving loom. 4,391,305, Cl. 139-435.000.

Takahashi, Tohru: *See*—
Tamura, Yasuyuki; Kanbe, Junichiro; Nakamura, Shunji; Toyono, Tsutomu; and Takahashi, Tohru, 4,391,891, Cl. 430-120.000.

Takamura, Tousaku, to Nissan Motor Co., Ltd. Diffuser and exhaust gas collector arrangement. 4,391,566, Cl. 415-209.000.

Takaoka, Tokuro: *See*—
Nishikawa, Masao; Toshimitsu, Yoshihiko; Aoyama, Toshihiko; Takaoka, Tokuro; Aoki, Takashi; and Sato, Yoichi, 4,391,342, Cl. 180-143.000.

Takara Co., Ltd.: *See*—
Nakane, Shigeru, 4,391,060, Cl. 46-22.000.

Takashima, Hiroaki: *See*—
Uemura, Seiichi; Yamamoto, Shunichi; Hirose, Takao; Takashima, Hiroaki; and Kato, Osamu, 4,391,788, Cl. 423-447.600.

Takasugi, Wasao: *See*—
Yokozawa, Norio; Takasugi, Wasao; Yonezawa, Seiji; and Ueyanagi, Kiichi, 4,392,219, Cl. 369-44.000.

Takatori, Yasushi: *See*—
Inoue, Eiichi; Takatori, Yasushi; and Haruta, Masahiro, 4,392,141, Cl. 346-1.100.

Takayama, Kenichiro: *See*—
Kimura, Kazuo; Takayama, Kenichiro; Ado, Yutaka; Kawamoto, Tamotsu; and Masuzaga, Izumi, 4,391,910, Cl. 435-232.000.

Takechi, Hiroshi; Katoh, Hiroshi; Koyama, Kazuo; and Usami, Kazuhide, to Nippon Steel Corporation. Process for producing cold rolled steel strip having excellent mechanical strength and useful for motor vehicles. 4,391,653, Cl. 148-12.00C.

Takeda Chemical Industries, Ltd.: *See*—
Minato, Ichiro; Shibata, Koichi; and Fujinami, Kimiya, 4,391,958, Cl. 525-504.000.
Tabuchi, Takeshi; and Abe, Matazo, 4,391,908, Cl. 435-144.000.

Takemae, Yoshihiro: *See*—
Nakano, Masao; Baba, Fumio; Nakano, Tomio; Takemae, Yoshihiro; and Mochizuki, Hirohiko, 4,392,211, Cl. 365-200.000.

Takematsu, Tetsuo; Isogawa, Takayuki; and Sakuraba, Yasuya, to Hodogaya Chemical Co., Ltd. Herbicidal composition. 4,391,631, Cl. 71-118.000.

Takemori, Satoshi: *See*—
Kuwabara, Kouji; Sugawara, Hiroyuki; Shirakura, Toshiharu; Sasaki, Kouji; and Takemori, Satoshi, 4,391,519, Cl. 356-153.000.

Takemoto, Iwao: *See*—
Aoki, Masakazu; Ando, Haruhisa; Ohba, Shinya; Hanamura, Shoji; Takemoto, Iwao; and Izawa, Ryuichi, 4,392,158, Cl. 358-213.000.

Takemura, Toji; and Hirashima, Kenzo, to Nissan Motor Co. Ltd. Clutch engageable/disengageable by momentary energization of solenoid means. 4,391,356, Cl. 192-84.00C.

Takeuchi, Minami: *See*—
Takigami, Katsuhiko; and Takeuchi, Minami, 4,392,175, Cl. 361-88.000.

Takigami, Katsuhiko; and Takeuchi, Minami, to Tokyo Shibaura Denki Kabushiki Kaisha. Protecting device for a gate turn-off thyristor. 4,392,175, Cl. 361-88.000.

Talerico, Joseph M.; and Fleischer, Henry. Water-saving device for use with toilets. 4,391,003, Cl. 4-415.000.

Tama Manufacturing Co., Limited: *See*—
Mashio, Sakae, 4,391,242, Cl. 123-198.00R.

Tamaki, Kenzo: *See*—
Kojima, Takafumi; Tamaki, Kenzo; and Yokota, Shiro, 4,392,026, Cl. 179-175.30R.

Tamamura, Junichi; Yasuda, Mamoru; Hosoda, Motomi; and Saeki, Shinichi, to Hosiden Electronics Co., Ltd. Condenser microphone. 4,392,025, Cl. 179-111.00R.

Tamiya, Yoshimichi; Eguchi, Yasukata; and Makabe, Hachiro, to Janome Sewing Machine Co., Ltd. Electronic control sewing machine. 4,391,212, Cl. 112-158.00E.

Tamosauskas, Albert E.; and Temple, Chester S., to PPG Industries, Inc. Aqueous peroxide emulsion for use with glass fibers. 4,391,876, Cl. 428-392.000.

Tamura, Yasuyuki; Kanbe, Junichiro; Nakamura, Shunji; Toyono, Tsutomu; and Takahashi, Tohru, to Canon Kabushiki Kaisha. Developing method using (alternating electric field and) a developer of the field-dependent type and an apparatus therefor. 4,391,891, Cl. 430-120.000.

Tanaka, Akira: *See*—
Ahad, Munir J.; Hollowell, William; Tanaka, Akira; and Ziv, Avraham, 4,391,420, Cl. 242-107.40A.

Tanaka, Hideharu; Ishijima, Koji; and Koda, Toshihide, to Mitsubishi Denki Kabushiki Kaisha. Horizontal rotary compressor with oil forced by gas discharge into crankshaft bore. 4,391,573, Cl. 418-63.000.

Tanaka, Kobun; and Kawaharazaki, Takashi, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Buckle arrangement for seat belts. 4,391,023, Cl. 24-230.0AL.

Tanaka, Shinichiro: *See*—
Kobashi, Mamoru; Tanaka, Shinichiro; and Saji, Hideo, 4,391,244, Cl. 123-339.000.

Tanaka, Yutaka: *See*—
Yatomi, Takeshi; and Tanaka, Yutaka, 4,392,041, Cl. 219-69.00W.

Tandjung, Halim S.: *See*—
Landrock, Jurgen B.; Perske, Manfred; and Tandjung, Halim S., 4,392,097, Cl. 318-696.000.

Tanner Companies, The: *See*—
Murray, Jesse L., 4,391,549, Cl. 404-87.000.

Tanner, Herbert: *See*—
Spindler, Manfred; Tanner, Herbert; Geiger, Friedhelm; Bittner, Friedrich; and Martens, Jurgen, 4,391,987, Cl. 562-559.000.
Spindler, Manfred; Tanner, Herbert; Geiger, Friedhelm; Bittner, Friedrich; and Martens, Jurgen, 4,391,988, Cl. 562-559.000.

Tarro, Giulio, to Depa S.p.A. Preparation of herpes simplex antigen for the diagnosis of carcinoma. 4,391,911, Cl. 435-239.000.

Taruntaev, V., to T. A. Systems, Inc. Orbital tool assembly for forming rivet heads. 4,391,121, Cl. 72-406.000.

Tarzia, Giorgio: *See*—
Mariani, Luigi; and Tarzia, Giorgio, 4,391,817, Cl. 424-274.000.

TateBe, Yoshikazu; Egami, Masafumi; and Miyawaki, Toshimitsu, to Mitsubishi Jukogyo Kabushiki Kaisha. Cylinder head for air-cooled engines. 4,391,231, Cl. 123-41.690.

Tavss, Edward A.; and Eigen, Edward, to Colgate-Palmolive Company. Non-irritating dentifrice. 4,391,798, Cl. 424-52.000.

Taylor, Lloyd D.: *See*—
Schwarzel, William C.; and Taylor, Lloyd D., 4,391,895, Cl. 430-215.000.

Taylor, Ray A.: *See*—
Taylor, Ray M., 4,391,304, Cl. 139-100.000.

Taylor, Ray M., to Taylor, Ray A. Warp tension structure. 4,391,304, Cl. 139-100.000.

Taylor, Robert A., to United States of America, Agriculture. Segmented fiber sampler. 4,391,153, Cl. 73-864.410.

Taylor, William D., Jr. Firewood carrier. 4,391,397, Cl. 224-265.000.

TDK Electronics Co., Ltd.: *See*—
Hosaka, Akihiko; Okuyama, Kiyotaka; and Isobe, Yukihiro, 4,391,864, Cl. 428-64.000.
Shibata, Fujio; Kawahara, Hiroshi; and Azegami, Hitoshi, 4,391,877, Cl. 428-457.000.

Technal International S.A.: *See*—
Laugier, Yves D., 4,391,031, Cl. 29-526.00R.

Technical Communications Corporation: *See*—
Slate, Matthew W., 4,392,021, Cl. 179-1.50R.

Teijin, Ltd.: *See*—
Suzuki, Togi; Tsunawaki, Kiyokazu; Wada, Osamu; and Kimura, Akio, 4,391,872, Cl. 428-224.000.

Tektronix, Inc.: *See*—
Deibele, Florian C., 4,391,461, Cl. 292-204.000.

Telefonaktiebolaget L M Ericsson: *See*—
Holgersson, Stig L., 4,391,303, Cl. 138-166.000.

Teletype Corporation: *See*—
Costello, Louis B., 4,392,083, Cl. 315-85.000.

Telford, Clive D.: *See*—
Kolombos, Alexander J.; Telford, Clive D.; and Young, Dennis, 4,392,003, Cl. 585-661.000.

Temple, Chester S.: *See*—
Tamosauskas, Albert E.; and Temple, Chester S., 4,391,876, Cl. 428-392.000.

Tencor Instruments: *See*—
Wheeler, William R., 4,391,044, Cl. 33-174.00P.

Tenney, William L. Gas compressor. 4,391,568, Cl. 417-237.000.

Tenud, Leander: *See*—
Huwiler, Alfred; and Tenud, Leander, 4,391,979, Cl. 548-194.000.

Terakura, Yukio: *See*—
Kubo, Seitoku; Kuramochi, Koujiro; and Terakura, Yukio, 4,391,166, Cl. 74-869.000.

Teramachi, Hiroshi. Linear bearing unit. 4,391,473, Cl. 308-6.00C.

Terashima, Akira: *See*—
Yoshizawa, Naomi; and Terashima, Akira, 4,392,244, Cl. 455-79.000.

Terry, Richard H.: *See*—
Mitchell, Ernst K.; and Terry, Richard H., 4,391,204, Cl. 109-39.000.

Tetra Pak Developpement SA: *See*—
Rausing, Hans, 4,391,385, Cl. 220-307.000.

Texaco Inc.: *See*—
Sung, Rodney L.; Sweeney, William M.; and Crawford, Wheeler C., 4,391,610, Cl. 44-56.000.
Virk, Kashmir S., 4,391,095, Cl. 60-286.000.

Texas Iron Works, Inc.: *See*—
Baker, Samuel F.; and Arnold, Ronald D., 4,391,325, Cl. 166-208.000.

**Thermon Manufacturing Company:** *See*—
Goss, David C.; and Springs, Daniel R., 4,392,051, Cl. 219-528.000.

**Theurer, Josef; Hansmann, Johann; and Riessberger, Klaus, to Franz Plasser Bahnbaumaschinen-Industriegesellschaft m.b.H.** Measuring apparatus for rail head running surface irregularities. 4,391,134, Cl. 73-146.000.

**Thies, Peter W.; and David, Samuel, to Kali-Chemie Pharma GmbH.** 2,9-Dioxa tricyclo [4,3,1,$0^{4,7}$] decane compounds and process of making same. 4,391,819, Cl. 424-278.000.

**Thomas & Betts Corporation:** *See*—
Izraeli, Hyman, 4,391,661, Cl. 156-49.000.

**Thomas, Reese R.:** *See*—
Pickens, Robert C., Jr.; Thomas, Reese R.; and Somerville, Ronald, 4,391,866, Cl. 428-92.000.

**Thomasson, Ronald G.:** *See*—
Lewis, James C.; Miller, Jerry W.; Simpson, Clyde D.; and Thomasson, Ronald G., 4,392,104, Cl. 324-54.000.

**Thompson, David J.:** *See*—
Harrison, Kenneth J.; Raynes, Edward P.; Saunders, Frances C.; and Thompson, David J., 4,391,489, Cl. 350-349.000.

**Thompson, Thomas C., to Quest Medical, Inc.** Intravenous drug additive delivery system with electronic control. 4,391,598, Cl. 604-65.000.

**Thomson - CSF:** *See*—
Benoit-Gonin, Roger; Berger, Jean L.; and Coutures, Jean L., 4,392,124, Cl. 340-347.0AD.
Del Giudice, Michel, 4,392,255, Cl. 455-328.000.
Papuchon, Michel; and Puech, Claude, 4,391,486, Cl. 350-96.140.
Volluet, Gerard; and Hartemann, Pierre, 4,392,115, Cl. 333-141.000.

**Thorn Emi Domestic Electrical Appliances Limited:** *See*—
Child, Robert P.; and Charles, Barry G., 4,391,762, Cl. 261-121.00R.

**Thornelow, Alec:** *See*—
Bristow, Ian T.; and Thornelow, Alec, 4,391,569, Cl. 417-302.000.

**Thunberg, Svante.** Heat exchanger in plants for ventilating rooms or buildings. 4,391,321, Cl. 165-54.000.

**Thurston, Michael E.; Cassada, William A., III; and Schardein, Daniel J., to Reynolds Metals Company.** Treatment for the alleviation of high temperature oxidation of aluminum. 4,391,655, Cl. 148-20.600.

**Thyssen Industrie AG:** *See*—
Benthake, Heinz; Kronert, Curt; and Kunnen, Josef, 4,391,163, Cl. 74-768.000.

**Tibbals, Edward C., Jr., to Loeffler, William R.** Electric motor drive with infinitely variable speed transmission. 4,391,156, Cl. 74-336.500.

**Tibbetts, Gary G., to General Motors Corporation.** Method for growing graphite fibers. 4,391,787, Cl. 423-447.300.

**Tidstrom, Erling, to Aktiebolaget Bofors.** Combat vehicle. 4,391,179, Cl. 89-46.000.

**Tiefel, Thomas H.:** *See*—
Jin, Sungho; and Tiefel, Thomas H., 4,391,656, Cl. 148-102.000.

**TII Corporation:** *See*—
Wortman, Donald W., 4,392,225, Cl. 370-75.000.

**Time and Frequency Technology, Inc.:** *See*—
Eckels, Calvin; and James, John, 4,392,248, Cl. 455-161.000.

**Timex Corporation:** *See*—
Yokota, Dick; Kuty, David; and Kinter, Malcolm, 4,391,531, Cl. 368-239.000.

**Tincher, Cline A.:** *See*—
Schwartz, Ellen S.; Tincher, Cline A.; and Maxwell, Jerrold F., 4,391,722, Cl. 252-73.000.

**TJT Food Flavoring, Inc.:** *See*—
Fiscella, James T., 4,391,834, Cl. 426-565.000.

**Tobin, Curtis L.:** *See*—
Ciarlei, Joseph A.; Tobin, Curtis L.; and Jennings, William B., 4,391,322, Cl. 165-125.000.

**Tobioka, Fumio:** *See*—
Kitane, Syoiti; Honjo, Shigeru; Ohe, Kuniyoshi; and Tobioka, Fumio, 4,391,658, Cl. 148-188.000.

**Tobita, Takashi:** *See*—
Kogoma, Kiyoshi; Ohashi, Yu; Niizeki, Jiro; Sone, Norio; and Tobita, Takashi, 4,391,994, Cl. 568-593.000.

**Tokai Metals Company Limited:** *See*—
Hirata, Isao, 4,391,366, Cl. 206-218.000.

**Tokarzewski, Richard J.:** *See*—
Sprecker, Mark A.; Hanna, Marie R.; Tokarzewski, Richard J.; Belko, Robert P.; Watkins, Hugh; and Vock, Manfred H., 4,391,284, Cl. 131-276.000.

**Tokyo Shibaura Denki Kabushiki Kaisha:** *See*—
Kitane, Syoiti; Honjo, Shigeru; Ohe, Kuniyoshi; and Tobioka, Fumio, 4,391,658, Cl. 148-188.000.
Kuniyoshi, Masateru, 4,392,099, Cl. 318-797.000.
Minemura, Koichi, 4,392,160, Cl. 358-327.000.
Niioka, Takeharu; and Kobayashi, Isao, 4,392,246, Cl. 455-158.000.
Shinozaki, Satoshi, 4,391,033, Cl. 29-576.00W.
Takigami, Katsuhiko; and Takeuchi, Minami, 4,392,175, Cl. 361-88.000.
Tsunoda, Sachio; and Sugisita, Kaneo, 4,391,097, Cl. 60-398.000.

**Tomita, Yoshiaki, to Yamaha Hatsudoki Kabushiki Kaisha.** Carburetor actuating system for V-engines. 4,391,261, Cl. 123-584.000.

**Tomita, Yoshifumi; and Nakai, Hiromitsu, to Hitachi, Ltd.** Method of manufacturing fluorescent screens of cathode ray tubes. 4,391,885, Cl. 430-28.000.

**Tomoe Special Machine Co., Ltd.:** *See*—
Watanabe, Michitoshi, 4,391,210, Cl. 112-104.000.

**Toppan Printing Co., Ltd.:** *See*—
Suzuki, Teruo, 4,391,899, Cl. 430-307.000.

**Toray Silicone Company, Ltd.:** *See*—
Shirahata, Akihiko, 4,391,963, Cl. 528-37.000.

**Torberger, Finn.** Arrangement for passing a first liquid close to, but without mixing it with a second liquid, for example an arrangement for sea water desalination. 4,391,676, Cl. 202-173.000.

**Toro Company, The:** *See*—
Porter-Bennett, David E., 4,391,041, Cl. 30-296.00R.

**Torres, Luis R.** Telephone handset lifting device. 4,392,017, Cl. 179-1.0HS.

**Tortella, Michele.** Variable speed digging machine provided with a gearbox having an orientable drive. 4,391,154, Cl. 74-15.400.

**Toshiba Electric Equipment Corporation:** *See*—
Ide, Katsuyuki; Ohe, Kempo; and Kobayashi, Hisao, 4,392,086, Cl. 315-174.000.

**Toshimitsu, Yoshihiko:** *See*—
Nishikawa, Masao; Toshimitsu, Yoshihiko; Aoyama, Toshihiko; Takaoka, Tokuro; Aoki, Takashi; and Sato, Yoichi, 4,391,342, Cl. 180-143.000.

**Towmotor Corporation:** *See*—
Jirousek, Norman F.; and Shipitalo, William M., 4,391,351, Cl. 188-18.00A.

**Toyo Boseki Kabushiki Kaisha:** *See*—
Imamura, Yoshio, 4,391,616, Cl. 55-35.000.

**Toyoda Koki Kabushiki Kaisha:** *See*—
Munekata, Kenichi; Unno, Kunihiko; and Shimizu, Norihiko, 4,391,066, Cl. 51-165.870.

**Toyoda, Takashi; Shishido, Tadao; and Tsujikawa, Teruaki, to Fuji Photo Film Co., Ltd.** Process for development-processing silver halide light-sensitive material. 4,391,900, Cl. 430-355.000.

**Toyono, Tsutomu:** *See*—
Tamura, Yasuyuki; Kanbe, Junichiro; Nakamura, Shunji; Toyono, Tsutomu; and Takahashi, Tohru, 4,391,891, Cl. 430-120.000.

**Toyota Jidosha Kogyo Kabushiki Kaisha:** *See*—
Bessho, Hironori, 4,391,243, Cl. 123-325.000.
Ito, Sumio, 4,391,253, Cl. 123-478.000.
Kobashi, Mamoru; Tanaka, Shinichiro; and Saji, Hideo, 4,391,244, Cl. 123-339.000.
Kubo, Seitoku; Kuramochi, Koujiro; and Terakura, Yukio, 4,391,166, Cl. 74-869.000.
Nakano, Jiro; and Ono, Hironobu, 4,391,130, Cl. 73-117.300.
Sawada, Hiroshi; and Demura, Takayuki, 4,391,256, Cl. 123-489.000.

**Trane Company, The:** *See*—
Wendschlag, James C., 4,391,104, Cl. 62-79.000.

**Transaction Technology, Inc.:** *See*—
Sears, Michael L., 4,392,023, Cl. 179-2.0DP.

**Treasurywala, Adi:** *See*—
Sestanj, Kazimir; Abraham, Nedumparambil A.; Bellini, Francesco; and Treasurywala, Adi, 4,391,816, Cl. 424-274.000.

**Tremblay, Jean:** *See*—
Tremblay, Richard; and Tremblay, Jean, 4,392,240, Cl. 378-207.000.

**Tremblay, Richard; and Tremblay, Jean, to Ministere Des Affaires Sociales.** Method and device for sampling radiation from X-ray machines for analysis. 4,392,240, Cl. 378-207.000.

**Trenkle, Robert W.:** *See*—
Mookherjee, Braja D.; Trenkle, Robert W.; Chant, Bernard J.; Ouwerkerk, Anton V.; Kamath, Venkatesh; and Mussinan, Cynthia J., 4,391,717, Cl. 252-8.600.

**Trevarrow, David.** Radial deformation means for cylindrical objects such as wheels. 4,391,120, Cl. 72-403.000.

**Trinh, Eugene:** *See*—
United States of America, National Aeronautics and Space Administration; Trinh, Eugene; and Wang, Taylor G., 4,391,129, Cl. 73-64.400.

**Troebel, Werner; and Bottcher, Martin, to Siemens Aktiengesellschaft.** Low-voltage protective circuit breaker with a forked locking lever. 4,392,036, Cl. 200-322.000.

**Trudel, Murray L.:** *See*—
Pfeifer, Robert F.; and Trudel, Murray L., 4,391,650, Cl. 148-1.500.

**Trumble, William P.; Finn, Roger C.; and Jackson, Charles F. C., to Northern Telecom Limited.** Telephone cable splices. 4,392,014, Cl. 174-92.000.

**TRW Inc.:** *See*—
Kiefer, Karl, 4,391,330, Cl. 166-341.000.

**Tsang, Paul J.:** *See*—
Horng, Cheng T.; Schwenker, Robert O.; and Tsang, Paul J., 4,392,149, Cl. 357-49.000.

**Tsao, Utah, to Lummus Company, The.** Recovery of heat and vaporized material from a reaction effluent. 4,391,880, Cl. 423-659.000.

**Tsuchida, Takayasu:** *See*—
Matsui, Hiroshi; Tsuchida, Takayasu; and Nakamori, Shigeru, 4,391,907, Cl. 435-115.000.

**Tsuda, Yukio:** *See*—
Yamada, Takaaki; Osakabe, Yoshio; and Tsuda, Yukio, 4,392,253, Cl. 455-165.000.

**Tsuji, Masuo, to Kabushiki Kaisha Suwa Seikosha.** Integrated circuit for timepiece. 4,392,216, Cl. 368-71.000.

**Tsuji, Nobuo:** *See*—
Yamada, Yasuyuki; Akashi, Goro; Tsuji, Nobuo; Mukaida, Yoshito; and Fujiyama, Masaaki, 4,391,851, Cl. 427-130.000.

**Tsuji, Sadahiko:** *See*—
Tajima, Akira; and Tsuji, Sadahiko, 4,391,493, Cl. 350-422.000.

Tsujikawa, Teruaki: *See—*
Toyoda, Takashi; Shishido, Tadao; and Tsujikawa, Teruaki, 4,391,900, Cl. 430-355.000.
Tsunawaki, Kiyokazu: *See—*
Suzuki, Togi; Tsunawaki, Kiyokazu; Wada, Osamu; and Kimura, Akio, 4,391,872, Cl. 428-224.000.
Tsunekawa, Tokuichi, to Canon Kabushiki Kaisha. Camera with exposure measuring system. 4,391,500, Cl. 354-31.000.
Tsunoda, Sachio; and Sugisita, Kaneo, to Tokyo Shibaura Denki Kabushiki Kaisha. Pumping up hydroelectric power plant. 4,391,097, Cl. 60-398.000.
Tubing Technology, Inc.: *See—*
Keathley, Anthony C.; Stanton, Howard F.; and Wagle, Mahesh M., 4,391,114, Cl. 72-78.000.
Tulcea, S.A.: *See—*
Staempfli, Jackie, 4,391,272, Cl. 604-110.000.
Tuominen, Tapio K.: *See—*
Aaltonen, Olavi A.; Malmstrom, Rolf E.; Nermes, Esko O.; and Tuominen, Tapio K., 4,391,632, Cl. 75-26.000.
Turner, Larry G. Steam injection apparatus. 4,391,229, Cl. 123-25.00B.
Tutt, Kingsley J.: *See—*
Peck, Alan M.; Tutt, Kingsley J.; and Walter, Andrew G. N., 4,391,011, Cl. 12-1.00B.
Tyler, Truman V.; and Sprague, Robert B., to Beall, Richard W., Jr.; Favara, Louis J.; Gausewitz, Richard L.; Carr, Richard F.; Rothenberg, Allan; and Edwards, Elgin. Reverse-osmosis water purifier apparatus and method. 4,391,712, Cl. 210-652.000.
Tzeng, Huann-Jang. Electronic device for arc welding equipment. 4,392,046, Cl. 219-130.100.
Ubusawa, Fumiyoshi: *See—*
Ohhashi, Shiro; Ubusawa, Fumiyoshi; Iwasaki, Shoji; and Manaka, Tetsuyuki, 4,392,243, Cl. 455-74.000.
Uemura, Seiichi; Yamamoto, Shunichi; Hirose, Takao; Takashima, Hiroaki; and Kato, Osamu, to Nippon Oil Co., Ltd. Starting pitches for carbon fibers. 4,391,788, Cl. 423-447.600.
Ueno, Kunihiko; Ishii, Akiyasu; Hukuda, Masazi; and Nakayama, Kazuyuki, to Kureha Kagaku Kogyo Kabushiki Kaisha. Process for the manufacture of halogen-containing resin particles of larger bulk density comprising mixing particles of the resin with inorganic salts, treated in a mixture in a gaseous phase and separating the inorganic salt from the product. 4,391,763, Cl. 264-15.000.
Ueyanagi, Kiichi: *See—*
Yokozawa, Norio; Takasugi, Wasao; Yonezawa, Seiji; and Ueyanagi, Kiichi, 4,392,219, Cl. 369-44.000.
Ullman, Edwin F.: *See—*
Litman, David J.; and Ullman, Edwin F., 4,391,904, Cl. 435-7.000.
Umezawa, Hamao; Aoyagi, Takaaki; Shirai, Tadashi; Nishizawa, Rinzo; Suzuki, Masao; and Saino, Tetsushi, to Nippon Kayaku Kabushiki Kaisha. Process for producing threo-3-amino-2-hydroxybutanoyl-aminoacetic acids, as well as novel intermediates therefor and process for producing them. 4,391,986, Cl. 562-444.000.
Union Carbide Corporation: *See—*
Burdett, Ian D., 4,391,919, Cl. 518-725.000.
Chan, John K., 4,391,759, Cl. 260-453.300.
Union Oil Company of California: *See—*
Gallus, Julius P., 4,391,329, Cl. 166-336.000.
Union Special Corporation: *See—*
Hsiao, James C., 4,391,216, Cl. 112-316.000.
United Kingdom Atomic Energy Authority: *See—*
Bentley, Peter D.; and Pollock, James F., 4,392,049, Cl. 219-401.000.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See—*
Harrison, Kenneth J.; Raynes, Edward P.; Saunders, Frances C.; and Thompson, David J., 4,391,489, Cl. 350-349.000.
U.S. Computer Systems, Inc.: *See—*
Price, Ronn; Brown, Gary; Muraski, Andrew A.; and Muraski, William C., 4,392,119, Cl. 340-38.00L.
United States of America
Agriculture: *See—*
Jurd, Leonard, 4,391,828, Cl. 424-340.000.
Taylor, Robert A., 4,391,153, Cl. 73-864.410.
Air Force: *See—*
Corley, Robert C.; and Myers, Frederick F., Jr., 4,391,660, Cl. 149-19.900.
Army: *See—*
Betts, Robert E., 4,391,196, Cl. 102-202.000.
Freeman, Wallace L., 4,391,678, Cl. 204-15.000.
Holmes, Allen B., 4,391,299, Cl. 137-831.000.
Mason, Arthur D., Jr.; Johnson, Avery A., Jr.; and Ritchey, Charles R., 4,391,799, Cl. 424-132.000.
Pagano, Victor H., 4,391,178, Cl. 89-36.00H.
Rebeschi, Thomas J.; and Kapoor, Mohan L., 4,392,084, Cl. 315-169.400.
Sayles, David C., 4,391,993, Cl. 568-4.000.
Commerce: *See—*
McBee, William C.; and Sullivan, Thomas A., 4,391,969, Cl. 528-389.000.
Energy: *See—*
Brassell, Gilbert W.; and Lewis, John, Jr., 4,391,873, Cl. 428-297.000.
Cook, Kenneth V.; Cunningham, Robert A., Jr.; and Murrin, Horace T., 4,391,143, Cl. 73-623.000.
Galloway, Terry R., 4,391,467, Cl. 299-2.000.
Haldipur, Gaurang B.; Anderson, Richard G.; and Cherish, Peter, 4,391,611, Cl. 48-197.00R.
Land, Cecil E.; and Peercy, Paul S., 4,391,901, Cl. 430-495.000.
Maschke, Alfred W., 4,392,080, Cl. 315-5.410.
Raymond, Leonard S., 4,391,846, Cl. 427-99.000.
National Aeronautics and Space Administration; administrator; with respect to an invention of:
Trinh, Eugene; and Wang, Taylor G. System for monitoring physical characteristics of fluids. 4,391,129, Cl. 73-64.400.
National Aeronautics and Space Administration: *See—*
Cantrell, John H., Jr.; and Heyman, Joseph S., 4,391,142, Cl. 73-610.000.
Kalvinskas, John J.; and Rohatgi, Naresh K., 4,391,609, Cl. 44-1.05R.
Owen, Robert B.; and Witherow, William K., 4,391,518, Cl. 356-129.000.
Pruett, Edwin C.; Robertson, Kem B.; and Loughead, Tomas E., 4,391,423, Cl. 244-161.000.
Webster, Larry D., 4,391,514, Cl. 356-1.000.
Navy: *See—*
Forrester, Howard M.; and Crisler, John R., 4,391,515, Cl. 356-5.000.
Hurst, Dennis P., 4,392,241, Cl. 455-26.000.
Perkins, Henry T.; Saunders, Kim D.; and Green, Albert W., 4,391,136, Cl. 73-189.000.
Yoder, Max N., 4,391,651, Cl. 148-1.500.
U.S. Philips Corporation: *See—*
Alting, Cornelis L.; Brehm, Rudolf; and Haisma, Jan, 4,391,622, Cl. 65-66.000.
Boullart, Carolus J.; and Liefkens, Adrianus C. H. J., 4,392,169, Cl. 360-130.330.
Hinz, Hans D.; and Lobl, Herbert, 4,392,194, Cl. 346-154.000.
Janssens, Wilhelmus G. E.; and Merges, Heinz, 4,391,047, Cl. 34-97.000.
Joormann, Hendrik J. M., 4,392,167, Cl. 360-120.000.
Lersmacher, Bernhard; and Lydtin, Hans, 4,392,238, Cl. 378-144.000.
Meden-Piesslinger, Gertraud A. A.; and Van de Heuvel, Johannes H. P., 4,391,915, Cl. 501-48.000.
Rijckaert, Albert M. A.; de Niet, Edmond; and Beun, Jacobus P., 4,392,163, Cl. 360-76.000.
Van de Bult, Oelke, 4,391,035, Cl. 29-603.000.
van Deursen, Theodorus H. M., 4,392,247, Cl. 455-161.000.
United States Steel Corporation: *See—*
Martin, Wayne A., 4,391,118, Cl. 72-356.000.
United States Tennis Gut Association, Inc.: *See—*
Salsky, Jerome; Janis, Patrick K.; and Branen, Kenneth E., 4,391,088, Cl. 57-234.000.
United Technologies Corporation: *See—*
Fischer, William C.; Adams, Don L.; Verzella, David J.; and Wright, Stuart C., 4,392,203, Cl. 364-434.000.
University of Rochester, The: *See—*
Kende, Andrew S.; Curran, Dennis P.; King, Margaret L.; and Feldstein, Neil A., 4,391,982, Cl. 549-433.000.
Unno, Kunihiko: *See—*
Munekata, Kenichi; Unno, Kunihiko; and Shimizu, Norihiko, 4,391,066, Cl. 51-165.870.
Upjohn Company, The: *See—*
Lin, Chung-Yuan, 4,391,751, Cl. 260-239.30R.
Upton, Garthop. Shaded lamp for reading and like purposes. 4,392,190, Cl. 362-281.000.
Uragami, Hideaki. Magnetic medical treatment member. 4,391,270, Cl. 128-1.300.
Uram, John R., Jr., to Goodyear Aerospace Corporation. High temperature thermobarrier compositions. 4,391,924, Cl. 521-178.000.
Urani, Angelo, to McGraw-Edison Company. In-line fuse holder for miniature plug-in fuse. 4,391,485, Cl. 339-191.00S.
Urban, Milfred W. Fuel conditioner and method of conditioning fuel to an internal combustion engine therewith. 4,391,259, Cl. 123-557.000.
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Usami, Kiyoshi: *See—*
Inoue, Yozo; Ito, Yoji; Hara, Kiyoshi; Usami, Kiyoshi; and Iwata, Yasuhiro, 4,391,320, Cl. 165-2.000.
USM Corporation: *See—*
Peck, Alan M.; Tutt, Kingsley J.; and Walter, Andrew G. N., 4,391,011, Cl. 12-1.00B.
Vac-Tec Systems, Inc.: *See—*
Morrison, Charles F., Jr., 4,391,697, Cl. 204-298.000.
Valmet OY: *See—*
Koski, Erkki, 4,391,217, Cl. 118-405.000.
Lehtinen, Antti, 4,391,672, Cl. 162-192.000.
Van Dam Machine Corporation of America: *See—*
Fardin, Carlos, 4,391,560, Cl. 414-107.000.
van Laack, Schmitz & Eltschig GmbH u. Co.: *See—*
Hoffmann, Rolf, 4,391,394, Cl. 223-37.000.
Van de Bult, Oelke, to U.S. Philips Corporation. Method of mounting a magnetic head unit on a movable carrier. 4,391,035, Cl. 29-603.000.
Van de Heuvel, Johannes H. P.: *See—*
Meden-Piesslinger, Gertraud A. A.; and Van de Heuvel, Johannes H. P., 4,391,915, Cl. 501-48.000.
van den Berg, Johan H., to Champion Spark Plug Europe S.A. Pivot connection for wiper blades. 4,391,015, Cl. 15-250.420.
van der Velden, Hendricus J., to Stork Screens, B.V. Method of making a sleeve for a printing cylinder. 4,391,898, Cl. 430-306.000.

van der Zypen, Eugen: *See*—
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Fusco, Gerard A.; and van Lier, Glenn, 4,391,638, Cl. 106-20.000.

van Lit, Klaas J., to S. C. Johnson & Son, Inc. Electrically heated vapor dispenser. 4,391,781, Cl. 422-125.000.

Van Noy, John H.: *See*—
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van Zanten, Anton, to Robert Bosch GmbH. Method and apparatus for detecting engine knock in an internal combustion engine. 4,391,126, Cl. 73-35.000.

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Smith, Verity C., 4,391,713, Cl. 210-652.000.

Varco International, Inc.: *See*—
Boyadjieff, George I.; and Campbell, Andrew B., 4,391,333, Cl. 166-379.000.

Vari-Lite, Ltd.: *See*—
Bornhorst, James M., 4,392,187, Cl. 362-233.000.

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Freer, William G.; Varney, John C.; and Williamson, John H., 4,391,491, Cl. 350-341.000.

VEB Werk fuer Fernsehelektronik Berlin im VEB Kombinat Mikroelektronik: *See*—
Kuschel, Frank; Demus, Dietrich; Pfeiffer, Doris; and Deutscher, Hans-Joachim, 4,391,730, Cl. 252-299.100.

Velmin, Rolf; Kovatch, Michael S.; and Mautz, Gus H., Jr., to Republic Steel Corporation. Coke delivery apparatus and method. 4,391,674, Cl. 201-41.000.

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Charbonnier, Simon, 4,391,090, Cl. 57-279.000.

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Schreurs, Petrus H. M.; and Verhelst, Willem F., 4,391,962, Cl. 526-200.000.

Vermes nee Szluha, Borbala: *See*—
Korbonits, Dezso; Nogradi, Mihaly; Vermes nee Szluha, Borbala; Strelisky, Janos; Wolfner, Andras; Heja, Gergely; Kovacz, Gabor; Szegi, Jozsef; and Virag, Sandor, 4,391,821, Cl. 424-283.000.

Vermillion, Don W.; Gromek, Francis S.; and Bair, Scott S., III, to Singer Company, The. Vacuum cleaner with wheel and nozzle height adjusting mechanism. 4,391,018, Cl. 15-339.000.

Vermillion, Eugene F., to Columbus Show Case Company, The. Free standing wall. 4,391,069, Cl. 52-126.400.

Verzella, David J.: *See*—
Fischer, William C.; Adams, Don L.; Verzella, David J.; and Wright, Stuart C., 4,392,203, Cl. 364-434.000.

Vesley, George F., to Minnesota Mining and Manufacturing Company. Photoactive mixture of acrylic monomers and chromophore-substituted halomethyl-1-triazine. 4,391,687, Cl. 204-159.160.

Vetco Offshore, Inc.: *See*—
Jones, Darrell L., 4,391,554, Cl. 405-224.000.

Vetter, Rudi O. H.: *See*—
Hanlon, Richard J.; and Vetter, Rudi O. H., 4,391,408, Cl. 339-75.00M.

Victor Company of Japan, Ltd.: *See*—
Ota, Yoshihiko; and Kosaka, Yositeru, 4,392,161, Cl. 360-10.300.

Vietor, Francis H., to J. I. Case Company. Bucket position indicator assembly. 4,391,563, Cl. 414-698.000.

Villiger, Alois: *See*—
Boller, Arthur; Schadt, Martin; and Villiger, Alois, 4,391,731, Cl. 252-299.620.

Vincent, Coye T.: *See*—
Ford, Franklin C.; Hill, Gilman A.; and Vincent, Coye T., 4,391,337, Cl. 175-4.600.

Virag, Sandor: *See*—
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Virk, Kashmir S., to Texaco Inc. Internal combustion engine with exhaust filter rejuvenation. 4,391,095, Cl. 60-286.000.

Vizelyi, Gabor. Logical skill toy. 4,391,445, Cl. 273-158.000.

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Vock, Manfred H.: *See*—
Sprecker, Mark A.; Hanna, Marie R.; Tokarzewski, Richard J.; Belko, Robert P.; Watkins, Hugh; and Vock, Manfred H., 4,391,284, Cl. 131-276.000.

Vodyanitsky, Vilen: *See*—
Boverman, Bentsion; and Vodyanitsky, Vilen, 4,391,170, Cl. 83-71.000.

Voest-Alpine Aktiengesellschaft: *See*—
Lindquist, Herman A., 4,392,063, Cl. 290-54.000.

Voetz, Franz J.: *See*—
Eckardt, Peter; and Voetz, Franz J., 4,391,644, Cl. 106-85.000.

Voith Getriebe KG: *See*—
Polzer, Erich; Ruetz, Gottfried; Schmolz, Hubert; and Pochon, Remy, 4,391,096, Cl. 60-335.000.

Volkmann GmbH & Co.: *See*—
Greive, Aloys; Horstmann, Aloys; and Stupirak, Wilhelm, 4,391,087, Cl. 57-58.520.

Volluet, Gerard; and Hartemann, Pierre, to Thomson-CSF. Volume magnetostatic wave device. 4,392,115, Cl. 333-141.000.

Vorbruggen, Helmut, to Schering Aktiengesellschaft. Derivatives of antiphlogistically effective carboxylic acids, their preparation and medicinal use. 4,391,814, Cl. 424-272.000.

Voropaev, Albert A.: *See*—
Bykhovsky, David G.; Voropaev, Albert A.; Olennikov, Evgeny F.; and Lopatina, Alla V., 4,392,047, Cl. 219-145.210.

W. C. Heraeus GmbH: *See*—
Fabian, Peter; and Muller, Theo, 4,391,879, Cl. 428-551.000.

W. R. Grace & Co., Cryovac Division: *See*—
Bornstein, Norman D.; and Walters, Johnnie J., 4,391,862, Cl. 428-35.000.

Wacker-Chemie GmbH: *See*—
Kleine, Willi; and Frey, Werner, 4,391,960, Cl. 526-74.000.

Wada, Masaru: *See*—
Itoh, Kunio; Sugino, Takashi; Wada, Masaru; and Shimizu, Hirokazu, 4,392,227, Cl. 372-46.000.

Wada, Osamu: *See*—
Suzuki, Togi; Tsunawaki, Kiyokazu; Wada, Osamu; and Kimura, Akio, 4,391,872, Cl. 428-224.000.

Wada, Shohachi: *See*—
Mitra, Gautam; Coan, Michael H.; and Wada, Shohachi, 4,391,746, Cl. 260-112.00B.

Wada, Takuo: *See*—
Ohyama, Hiroshi; Morita, Ken; Wada, Takuo; and Miyahara, Masahiko, 4,391,804, Cl. 424-245.000.

Wada, Yasusuke: *See*—
Maeda, Umio; Shoji, Hirofumi; Wada, Yasusuke; and Horie, Yoshio, 4,391,743, Cl. 252-518.000.

Wagenaar, Loren B.: *See*—
Runnels, Robert W.; Wagenaar, Loren B.; Luke, Louis E.; and Bresnahan, Thomas P., 4,392,015, Cl. 174-143.000.

Waggoner, Marion G., to Du Pont de Nemours, E. I., and Company. Molding blends. 4,391,936, Cl. 524-89.000.

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Keathley, Anthony C.; Stanton, Howard F.; and Wagle, Mahesh M., 4,391,114, Cl. 72-78.000.

Wagner, John P., to Exxon Research and Engineering Co. Coalescer apparatus for electrostatically resolving emulsions. 4,391,698, Cl. 204-302.000.

Wakabayashi, Shigemasa, legal representative: *See*—
Wakabayashi, Takuo, deceased; Wakabayashi, Shigemasa, legal representative; Tahara, Iwao; Aihara, Toshiharu; Takahashi, Naoki; and Matsuo, Yushin, 4,391,530, Cl. 368-63.000.

Wakabayashi, Takuo, deceased; by Wakabayashi, Shigemasa, legal representative; Tahara, Iwao; Aihara, Toshiharu; Takahashi, Naoki; and Matsuo, Yushin, to Casio Computer Co., Ltd. Electronic timepiece. 4,391,530, Cl. 368-63.000.

Waki, Masahiko, to Citizen Watch Co. Ltd. Back cover fixing structure for wristwatch. 4,391,533, Cl. 368-281.000.

Walck, Vernon R. Shock damping face guard strap for football helmets. 4,390,995, Cl. 2-9.000.

Waldrop, T. William, to Sperry Corporation. Automatic latch for unloading auger. 4,391,363, Cl. 198-865.000.

Walraevens, Rene: *See*—
Hardy, Nicolas; Lerot, Luc; and Walraevens, Rene, 4,391,753, Cl. 549-525.000.

Walser, Reimund: *See*—
Holan, George; and Walser, Reimund, 4,391,820, Cl. 424-282.000.

Walter, Andrew G. N.: *See*—
Peck, Alan M.; Tutt, Kingsley J.; and Walter, Andrew G. N., 4,391,011, Cl. 12-1.00B.

Walter, Karl-Heinz, to Siemens Aktiengesellschaft. Integratable activation module for passive electrooptical displays. 4,392,131, Cl. 340-803.000.

Walter, Richard T.: *See*—
Saar, David A.; and Walter, Richard T., 4,392,101, Cl. 320-20.000.

Walters, Johnnie J.: *See*—
Bornstein, Norman D.; and Walters, Johnnie J., 4,391,862, Cl. 428-35.000.

Wang, Chih C.; and Bates, Ronald F., to RCA Corporation. Bis(hydroxylkyl)disiloxanes and lubricant compositions thereof. 4,391,720, Cl. 252-49.600.

Wang Laboratories, Inc.: *See*—
Nelson, Alfred M.; and Rasekhi, Houshang, 4,392,179, Cl. 361-234.000.

Wang, Taylor G.: *See*—
United States of America, National Aeronautics and Space Administration; Trinh, Eugene; and Wang, Taylor G., 4,391,129, Cl. 73-64.400.

Wang, Teh P.; and Korn, Elmer J., to Amax Inc. Method for detecting whether dissimilar metals are being welded. 4,392,044, Cl. 219-118.000.

Wang, Yu-Chang J.; Dursch Friedrich; O'Laughlin, Richard L.; and Prusik, Thaddeus, to E. R. Squibb & Sons, Inc. Steroid monohydrates, formulations containing same and method. 4,391,755, Cl. 260-397.450.

Warner, Barry N., to Mobil Oil Corporation. Static correction for magnetotelluric data. 4,392,109, Cl. 324-350.000.

Warner-Lambert Company: *See*—
Elslager, Edward F., 4,391,809, Cl. 424-251.000.

Washington, Leroy, Jr. Packaging and dispensing system. 4,391,368, Cl. 206-484.000.

Watanabe, Kunihiko: *See*—
Niinomi, Naoyuki; and Watanabe, Kunihiko, 4,391,176, Cl. 84-1.170.

Watanabe, Michitoshi, to Tomoe Special Machine Co., Ltd. Tag attaching machine. 4,391,210, Cl. 112-104.000.

Waterbury Companies, Inc.: *See*—
Marcy, Russell A., 4,391,111, Cl. 70-162.000.

Waters, Kenneth H.: *See*—
Coon, Julian B.; Fowler, James C.; Payton, Charles E.; and Waters, Kenneth H., 4,391,336, Cl. 175-45.000.

Watkins, Hugh: *See*—
Sprecker, Mark A.; Hanna, Marie R.; Tokarzewski, Richard J.; Belko, Robert P.; Watkins, Hugh; and Vock, Manfred H., 4,391,284, Cl. 131-276.000.

Watson, David D.: *See*—
Akerberg, Denis W.; and Watson, David D., 4,391,946, Cl. 524-849.000.

Watson, W. Keith R. Controlled solar heating and heat retention of liquid. 4,391,269, Cl. 126-437.000.

Watts, Verne C.: *See*—
Weber, Henry J.; Hoechst, Lonnie D.; Christensen, James R.; and Watts, Verne C., 4,391,344, Cl. 180-271.000.

Way, Peter F. Process for the recovery of vaporized sublimates from gas streams. 4,391,617, Cl. 55-82.000.

Wayte, Alline R.: *See*—
Burnett, George H.; Claflin, Warren E.; Lanzillotti, Harry V.; Lilly, A. Clifton, Jr.; Nienow, John F.; Osdene, Thomas S.; and Wayte, Alline R., 4,391,285, Cl. 131-364.000.

Webb, Jimmy L.: *See*—
Cleveland William K. S.; Webb, Jimmy L.; and Orlando, Charles M., 4,391,996, Cl. 568-726.000.

Weber, Henry J.; Hoechst, Lonnie D.; Christensen, James R.; and Watts, Verne C., to Clark Equipment Company. Loader operator restraint. 4,391,344, Cl. 180-271.000.

Weber, William B.: *See*—
Ishler, William E.; Weber, William B.; and Giudici, Livio L., 4,392,076, Cl. 313-318.000.

Webster, Harold F.: *See*—
Glascock, Homer H., II; Houston, Douglas E.; McLaughlin, Michael H.; and Webster, Harold F., 4,392,153, Cl. 357-82.000.

Webster, Larry D., to United States of America, National Aeronautics and Space Administration. Sidelooking laser altimeter for a flight simulator. 4,391,514, Cl. 356-1.000.

Wehrli, Rudolf: *See*—
Hoegerle, Karl; Gsell, Laurenz; and Wehrli, Rudolf, 4,391,810, Cl. 424-251.000.

Weidler, Erhard A., to RUD-Kettenfabrik Rieger & Dietz GmbH u. Co. Tire chain. 4,391,313, Cl. 152-171.000.

Weidner, Barry. Method of producing a looped strand lacing member for use in transplanting trees. 4,391,030, Cl. 29-509.000.

Weiertz, Stig H. A.; and Janiszewski, Grzegorz K., to AB Volvo. Overdrive for motor vehicles. 4,391,164, Cl. 74-781.00R.

Weinberg, Alan: *See*—
O'Sullivan, Dermot; and Weinberg, Alan, 4,392,103, Cl. 323-222.000.

Weinhold, Heinz: *See*—
Langenberg, Helmut; Grisebach, Hans-Theodor; and Weinhold, Heinz, 4,391,470, Cl. 299-11.000.

Weirich, Walter; Dettmers, Michael; Becker, Kunibert; and Rosenberg, Harry, to Gewerkschaft Eisenhutte Westfalia. Hydraulic control systems for mining apparatus. 4,391,181, Cl. 91-29.000.

Weirich, Walter; and Heitkamp, Herbert, to Gewerkschaft Eisenhutte Westfalia. Hydraulic control systems for and methods of controlling the operation of tunnelling apparatus. 4,391,553, Cl. 405-141.000.

Weiss, Bernard J.: *See*—
Day, William J.; and Weiss, Bernard J., 4,392,038, Cl. 219-10.55D.

Welles, Kenneth B., II, to General Electric Company. Capacitive commutating filter. 4,392,068, Cl. 307-522.000.

Welter, Albert, to Champion International Corporation. Sleeve valve for flexible bags. 4,391,404, Cl. 229-62.500.

Wendschlag, James C., to Trane Company, The. Cascade heat pump for heating water and for cooling or heating a comfort zone. 4,391,104, Cl. 62-79.000.

Wendt, Michael, to Lyle Development, Inc. Trim press including ejector. 4,391,171, Cl. 83-82.000.

Wenk, Erich: *See*—
Koziol, Konrad; and Wenk, Erich, 4,391,695, Cl. 204-286.000.

Wessel, Kenneth R., to Sealectro Corporation. Miniature matrix programming board. 4,391,479, Cl. 339-18.00C.

Western Electric Co., Inc.: *See*—
Boggs, Luther M.; and Gardner, William B., 4,391,516, Cl. 356-73.100.
Greene, Richard A.; and Kennedy, Robert P., 4,391,038, Cl. 29-829.000.
Jabben, Gary D., 4,392,181, Cl. 361-401.000.
Kent, William C., 4,391,220, Cl. 118-707.000.

Western Marine Electronics, Inc.: *See*—
Intlekofer, Michael J.; Hanson, Jay R.; and Lee, Thomas E., 4,392,137, Cl. 343-5.0SC.

Western Publishing Inc.: *See*—
Bockholt, Karlheinz H., 4,392,053, Cl. 235-472.000.

Westfalia Separator AG: *See*—
Icking, Friedrich; and Stolte, Friedrich, 4,391,222, Cl. 119-14.170.

Westinghouse Electric Corp.: *See*—
Frola, Frank V., 4,392,193, Cl. 363-128.000.

Lin, Ching-Yu; and Hickam, William M., 4,391,690, Cl. 204-412.000.

Roberts, Richard D.; and Hoffman, Lester J., 4,392,091, Cl. 318-52.000.

Runsels, Robert W.; Wagenaar, Loren B.; Luke, Louis E.; and Bresnahan, Thomas P., 4,392,015, Cl. 174-143.000.

Sassano, Daniel R., 4,391,947, Cl. 525-11.000.

Scala, Luciano C.; and Cargnel, Louis A., 4,391,933, Cl. 523-454.000.

Westvaco Corporation: *See*—
Brown, George N., 4,391,586, Cl. 432-58.000.

Weyandt, Ronald R., to Automated Packaging Systems, Inc. Control marking detector. 4,392,056, Cl. 250-339.000.

Weyerhaeuser Company: *See*—
Drinon, Alva C., 4,391,405, Cl. 229-31.00R.

Wheeler, William R., to Tencor Instruments. Metrology instrument for measuring vertical profiles of integrated circuits and the like. 4,391,044, Cl. 33-174.00P.

Whillock, Allan A.: *See*—
Self, Robert W.; and Whillock, Allan A., 4,391,833, Cl. 426-523.000.

White, James S., Sr., to White, James Sanford, Sr.; and White, James Sanford, Jr. Candle assembly including a windowsill stabilizer. 4,392,191, Cl. 362-392.000.

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White, James S., Sr., 4,392,191, Cl. 362-392.000.

White, James Sanford, Sr.: *See*—
White, James S., Sr., 4,392,191, Cl. 362-392.000.

Whitin Roberts Company: *See*—
Kamel, Fouad A., 4,391,021, Cl. 19-253.000.

Whitlock, William C., III. Image projector. 4,391,499, Cl. 353-122.000.

Whitman Medical Corporation: *See*—
Sharpless, Edward N.; Gordon, Marvin; and Lichtenstein, Joseph, 4,391,283, Cl. 128-725.000.

Whitney, Ralph H., to Owens-Illinois, Inc. Bottle finish and closure combination with venting slots. 4,392,055, Cl. 215-307.000.

Whitworth, Edward. Propulsion drive systems. 4,391,593, Cl. 440-70.000.

Wick, Gerhard; and Schulze, Helmut, to Akzo NV. Embedding mass of polyurethane. 4,391,964, Cl. 528-74.500.

Wicke, Charles A.; and Riley, Wayne C., to Emerson Electric Company. Instant hot water dispenser. 4,391,459, Cl. 285-238.000.

Wieland, Erich G., to Koenig & Bauer AG. Bearing arrangement for an ink fountain in a rotary printing machine. 4,391,192, Cl. 101-350.000.

Wiggins, Edmund C., to Barry-Wehmiller Company. Method of and apparatus for compensating signal drift during container inspection. 4,391,373, Cl. 209-526.000.

Wiggins Teape Group Limited, The: *See*—
Shanton, Kenneth J., 4,391,850, Cl. 427-150.000.

Wilde, Robert F. Photographic film with variable windows. 4,391,902, Cl. 430-501.000.

Wilhelm Hedrich Vakuumanlagen GmbH & Co. KG: *See*—
Hedrich, Wilhelm; Krumm, Heinz; and Haeuser, Erhard, 4,391,529, Cl. 366-266.000.

Wilkens, Achim, to Siemens Aktiengesellschaft. X-Ray diagnostic system for angiographic x-ray photographic series. 4,392,239, Cl. 378-146.000.

Will, Bernhard: *See*—
Schmitter, Ernst; Birzele, Paul; Buchmann, Klaus; Geitz, Gerhard; Will, Bernhard; and Beifuss, Wolfgang, 4,392,199, Cl. 364-200.000.

Williams, Raymond L., to General Electric Company. Altitude sensing control apparatus for a gas turbine engine. 4,391,290, Cl. 137-81.100.

Williamson, John H.: *See*—
Freer, William G.; Varney, John C.; and Williamson, John H., 4,391,491, Cl. 350-341.000.

Williamson, Richard D.; and Selinko, George J., to Motorola, Inc. Housing arrangement with breakaway battery access door. 4,391,883, Cl. 429-97.000.

Willis, Donald H.: *See*—
Rinehart, James K.; Willis, Donald H.; and Luz, David W., 4,392,090, Cl. 315-411.000.

Wilson Greatbatch Ltd.: *See*—
Liang, Charles C.; Bolster, M. Elizabeth; and Murphy, Robert M., 4,391,729, Cl. 252-182.100.

Wilson, Joseph G., to Ingersoll-Rand Company. Multi-station downflow centrifugal separation method and apparatus for separating particulate matter from gases. 4,391,613, Cl. 55-1.000.

Wilson, Robert W., to Powell Manufacturing Company, Inc. Tobacco defoliating units with overlapping cutting edges. 4,391,084, Cl. 56-27.500.

Windish, Michael W., to Wintec Company. Method of and apparatus for the production of nodular (ductile) cast iron. 4,391,636, Cl. 75-130.00R.

Wintec Company: *See*—
Windish, Michael W., 4,391,636, Cl. 75-130.00R.

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Huber, Calvin O.; Schick, Karl G.; and Coburn, Joel T., 4,391,775, Cl. 422-68.000.

Wishon, Berhl E.: *See*—
Michael, David J.; and Wishon, Berhl E., 4,391,917, Cl. 501-100.000.

Witherow, William K.: *See*—
Owen, Robert B.; and Witherow, William K., 4,391,518, Cl. 356-129.000.

Witzel, Bruce E.: *See*—
Dybas, Richard A.; Grier, Nathaniel; and Witzel, Bruce E., 4,391,812, Cl. 424-267.000.

Wobky, Peter: *See*—
Bianchi, Valerio; Ehrentraut, Franz-Josef; and Wobky, Peter, 4,391,249, Cl. 123-438.000.

Wolfe, Jon W.: *See*—
Derick, Burton N.; Moynihan, Robert E.; and Wolfe, Jon W., 4,391,867, Cl. 428-195.000.

Wolfe, Robert W.: *See*—
Malott, Theodore A.; and Wolfe, Robert W., 4,391,158, Cl. 74-473.00R.

Wolfe, Saul; and Shaw, Chia-Cheng, to Queen's University at Kingston. Process for 1-oxacephem derivatives. 4,391,975, Cl. 544-90.000.

Wolff Walsrode Aktiengesellschaft: *See*—
Huhn, Helmut; and Kaiser, Siegfried, 4,391,302, Cl. 138-118.100.

Wolfner, Andras: *See*—
Korbonits, Dezso; Nogradi, Mihaly; Vermes nee Szluha, Borbala; Strelisky, Janos; Wolfner, Andras; Heja, Gergely; Kovacz, Gabor; Szegi, Jozsef; and Virag, Sandor, 4,391,821, Cl. 424-283.000.

Wolfrum, Erhard: *See*—
Kersting, Hans-Joachim; Wolfrum, Erhard; Portz, Willi; and Strauss, Georg, 4,391,786, Cl. 423-442.000.

Wood, Kenneth A.: *See*—
Laird, William F.; and Wood, Kenneth A., 4,391,169, Cl. 83-37.000.

Wood, Mark S.: *See*—
Sutherland, Ray; and Wood, Mark S., 4,391,139, Cl. 73-273.000.

Wood, Thomas D.; Reiss, Garry K.; and Overly, Larry L., to J. B. Foote Foundry Co., The. Variable speed, multiple component pulley. 4,391,595, Cl. 474-33.000.

Woodrow, Peter A.: *See*—
El-Menshawy, Mohamed F.; Woodrow, Peter A.; and Bhattacharyya, Sushantha K., 4,392,110, Cl. 324-453.000.

Woodruff, Rebecca J.: *See*—
Piramoon, Alireza; and Woodruff, Rebecca J., 4,391,597, Cl. 494-20.000.

Woodruff, Robert A., to Ball Corporation. Interferometer. 4,391,525, Cl. 356-346.000.

Wool Development International Limited: *See*—
Bakker, Paul G. H., 4,391,605, Cl. 8-495.000.

Wortman, Donald W., to TII Corporation. Telephone carrier system repeater and power supply. 4,392,225, Cl. 370-75.000.

Wright, Ansel J.: *See*—
Rogers, Ronald A.; Wright, Ansel J.; and Wright, William H., 4,391,194, Cl. 101-471.000.

Wright, Harold T., to Disctron, Inc. Head lift mechanism. 4,392,165, Cl. 360-105.000.

Wright, Stuart C.: *See*—
Fischer, William C.; Adams, Don L.; Verzella, David J.; and Wright, Stuart C., 4,392,203, Cl. 364-434.000.

Wright, William H.: *See*—
Rogers, Ronald A.; Wright, Ansel J.; and Wright, William H., 4,391,194, Cl. 101-471.000.

Wu, Chung P.: *See*—
Pankove, Jacques I.; and Wu, Chung P., 4,392,011, Cl. 136-261.000.

Wu, Margaret M., to Mobil Oil Corporation. Production of para-isopropylphenol. 4,391,998, Cl. 568-781.000.

Wurlitzer Company, The: *See*—
Grajek, Stanley A.; Hill, Robert S.; and Klaiber, George S., 4,391,177, Cl. 84-196.000.

Wyszkowski, Jerzy; Panasiuk, Wladyslaw; Koprek, Stanislaw; and Piechal, Andzei, to Instytut Mechaniki Precyzyjnej. Method of thermo-chemical treatment of cutting tools and plastic working tools. 4,391,654, Cl. 148-16.600.

Xerox Corporation: *See*—
Acquaviva, Thomas, 4,391,504, Cl. 355-3.0SH.
Cherian, Abraham, 4,391,510, Cl. 355-3.0SH.
Hartke, David H., 4,391,490, Cl. 350-356.000.
Huggins, Raymond W., 4,391,842, Cl. 427-14.100.
Lu, Chin H., 4,391,890, Cl. 430-110.000.
Prest, William M., Jr.; and Roberts, Frederick J., Jr., 4,391,537, Cl. 400-144.200.
Seachman, Ned J.; and Price, Edgar E., 4,392,142, Cl. 346-1.100.
Silverberg, Morton, 4,391,505, Cl. 355-3.00R.

Yakovlev, Nikolai I.; Smolin, Anatoly T.; Kokovikhin, Vasily G.; and Kotunov, Alexei A. Non-contact device for monitoring electrical pulse signals. 4,392,106, Cl. 324-72.500.

Yamada, Shigeru; and Ohhara, Kazuya, to Clarion Co., Ltd. Audio device having a tone control cancelling circuit. 4,392,114, Cl. 333-28.00T.

Yamada, Takaaki; Osakabe, Yoshio; and Tsuda, Yukio, to Sony Corporation. Phase locked loop circuit. 4,392,253, Cl. 455-165.000.

Yamada, Toyotaka: *See*—
Imai, Toshihiro; and Yamada, Toyotaka, 4,391,521, Cl. 356-225.000.

Yamada, Yasuyuki; Akashi, Goro; Tsuji, Nobuo; Mukaida, Yoshito; and Fujiyama, Masaaki, to Fuji Photo Film Co., Ltd. Process for producing a magnetic recording medium. 4,391,851, Cl. 427-130.000.

Yamaguchi, Naoko: *See*—
Aya, Masahiro; Saito, Junichi; Yasui, Kazuomi; Kakabu, Shinzo; Kamochi, Atsumi; and Yamaguchi, Naoko, 4,391,629, Cl. 71-94.000.

Yamaguchi, Tokuji: *See*—
Murakami, Shozo; Yamanaka, Hiroaki; Yokoyama, Kazuhiro; Yone, Yasuhiro; and Yamaguchi, Tokuji, 4,391,702, Cl. 209-10.000.

Yamaguchi, Yuji: *See*—
Kawai, Shinji; Suzuki, Koichi; and Yamaguchi, Yuji, 4,391,004, Cl. 4-443.000.

Yamaha Hatsudoki Kabushiki Kaisha: *See*—
Tomita, Yoshiaki, 4,391,261, Cl. 123-584.000.

Yamakawa, Tohru; and Akiyama, Kozi, to Hitachi Maxell, Ltd. Device for making recording disc cartridge. 4,391,669, Cl. 156-539.000.

Yamamoto, Akira: *See*—
Ishihara, Toshinobu; Yamamoto, Akira; and Taguchi, Kenichi, 4,391,984, Cl. 560-236.000.

Yamamoto, Kaichi, to Sony Corporation. Digital video signal reproducing apparatus. 4,392,162, Cl. 360-10.300.

Yamamoto, Nobuyuki; Naruo, Kyoichi; and Okita, Tsutomu, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,391,874, Cl. 428-336.000.

Yamamoto, Shunichi: *See*—
Uemura, Seiichi; Yamamoto, Shunichi; Hirose, Takao; Takashima, Hiroaki; and Kato, Osamu, 4,391,788, Cl. 423-447.600.

Yamamoto, Yoshikazu; and Yanagi, Toshiaki, to Brother Kogyo Kabushiki Kaisha. Automatic sewing machine. 4,391,211, Cl. 112-121.120.

Yamanaka, Hiroaki: *See*—
Murakami, Shozo; Yamanaka, Hiroaki; Yokoyama, Kazuhiro; Yone, Yasuhiro; and Yamaguchi, Tokuji, 4,391,702, Cl. 209-10.000.

Yamane, Kazumasa; Kobayashi, Masahiro; and Takada, Masaniko, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Vinyl chloride copolymer and composition containing the same. 4,391,944, Cl. 524-548.000.

Yamane, Ken; and Nissan Motor Co., Ltd. Diaphragm actuator. 4,391,184, Cl. 92-100.000.

Yamaoka, David L.: *See*—
Yamaoka, Don N.; and Yamaoka, David L., 4,391,008, Cl. 5-200.00R.

Yamaoka, Don N.; and Yamaoka, David L. Elements for assembly of knocked-down waterbed pedestal. 4,391,008, Cl. 5-200.00R.

Yamauchi, Takashi; Maruhashi, Shigeaki; and Hasegawa, Morihiro, to Nisshin Steel Company, Ltd. Process for dephosphorization, desulfurization and denitrification of chromium-containing pig iron. 4,391,633, Cl. 75-53.000.

Yan, Tsoung-Yuan, to Mobil Oil Corporation. In situ uranium leaching using high pressure $CO_2/O_2$ system to overcome chloride ion inhibition. 4,391,782, Cl. 423-7.000.

Yanagi, Toshiaki: *See*—
Yamamoto, Yoshikazu; and Yanagi, Toshiaki, 4,391,211, Cl. 112-121.120.

Yanagihara, Hideo: *See*—
Naitoh, Katsumi; and Yanagihara, Hideo, 4,391,421, Cl. 242-107.700.

Yankee Metal Products, Inc.: *See*—
Anthony, Alfred, 4,391,053, Cl. 40-152.000.

Yasuda, Mamoru: *See*—
Tamamura, Junichi; Yasuda, Mamoru; Hosoda, Motomi; and Saeki, Shinichi, 4,392,025, Cl. 179-111.00R.

Yasui, Kazuomi: *See*—
Aya, Masahiro; Saito, Junichi; Yasui, Kazuomi; Kakabu, Shinzo; Kamochi, Atsumi; and Yamaguchi, Naoko, 4,391,629, Cl. 71-94.000.

Yates, Garry J.: *See*—
Riley, Eric K.; Smith, Colin D.; Yates, Garry J.; and Shepherd, Norris W., 4,391,585, Cl. 432-23.000.

Yatomi, Takeshi; and Tanaka, Yutaka, to Mitsubishi Denki Kabushiki Kaisha. Electric discharge machining apparatus with a wire-shaped electrode. 4,392,041, Cl. 219-69.00W.

Yoder, Max N., to United States of America, Navy. Method of forming a hyperabrupt interface in a GaAs substrate. 4,391,651, Cl. 148-1.500.

Yogo, Teruaki. Lace bending apparatus. 4,391,116, Cl. 72-168.000.

Yokota, Dick; Kuty, David; and Kinter, Malcolm, to Timex Corporation. Electrooptical display/lead frame subassembly and timepiece module including same. 4,391,531, Cl. 368-239.000.

Yokota, Shiro: *See*—
Kojima, Takafumi; Tamaki, Kenzo; and Yokota, Shiro, 4,392,026, Cl. 179-175.30R.

Yokoyama, Kazuhiro: *See*—
Murakami, Shozo; Yamanaka, Hiroaki; Yokoyama, Kazuhiro; Yone, Yasuhiro; and Yamaguchi, Tokuji, 4,391,702, Cl. 209-10.000.

Yokozawa, Norio; Takasugi, Wasao; Yonezawa, Seiji; and Ueyanagi, Kiichi, to Hitachi, Ltd. Method and device for recording and reproducing tracking information. 4,392,219, Cl. 369-44.000.

Yone, Yasuhiro: *See*—
Murakami, Shozo; Yamanaka, Hiroaki; Yokoyama, Kazuhiro; Yone, Yasuhiro; and Yamaguchi, Tokuji, 4,391,702, Cl. 209-10.000.

Yonezawa, Seiji: *See*—
Yokozawa, Norio; Takasugi, Wasao; Yonezawa, Seiji; and Ueyanagi, Kiichi, 4,392,219, Cl. 369-44.000.

Yoshida Kogyo K. K.: *See*—
Oda, Kiyoshi, 4,391,022, Cl. 24-205.14R.

Yoshida, Koichi; and Hayano, Fusakazu, to Asahi Kasei Kogyo Kabushiki Kaisha. Cell cultivation method and floating animal cell culture unit for the same. 4,391,912, Cl. 435-241.000.

Yoshida, Takashi: *See*—
Mita, Kikuo; Oyama, Masayuki; Yoshida, Takashi; Nakashima, Masato; Fujihara, Katsumi; and Nakakuki, Tadao, 4,392,120, Cl. 382-22.000.

Yoshida, Takeo: *See*—
Masamoto, Junzo; Hamada, Minoru; Suzuki, Isamu; and Yoshida, Takeo, 4,391,741, Cl. 252-511.000.
Yoshino Kogyosho Co., Ltd.: *See*—
Ota, Akiho; and Negishi, Fumio, 4,391,381, Cl. 215-1.00C.
Yoshizawa, Naomi; and Terashima, Akira, to Pilot Mannenhitsu Kabushiki Kaisha. Automatic transmission and reception control system. 4,392,244, Cl. 455-79.000.
Young, Dennis: *See*—
Kolombos, Alexander J.; Telford, Clive D.; and Young, Dennis, 4,392,003, Cl. 585-661.000.
Young, Jack W.; and Krill, Alvin G. Sewage back-up alarm. 4,392,128, Cl. 340-616.000.
Young, Terry A.; and Mast, Aquila D., to Sperry Corporation. Automatic latch for unloading auger. 4,391,364, Cl. 198-865.000.
Young, William E.: *See*—
Brody, Aaron L.; Embro, Joseph J.; and Young, William E., 4,391,080, Cl. 53-426.000.
Yuasa Battery Company Limited: *See*—
Kishimoto, Kenjiro; Igarashi, Hideaki; and Kono, Migaki, 4,391,036, Cl. 29-623.200.
Yuki, Ikuo: *See*—
Matsuura, Shigeo; and Yuki, Ikuo, 4,392,249, Cl. 455-164.000.
Zaha, Juergen H.: *See*—
Choudhury, Hrishikesh; and Zaha, Juergen H., 4,391,028, Cl. 29-235.000.
Zahnradfabrik Friedrichshafen AG: *See*—
Bucksch, Manfred, 4,391,354, Cl. 188-71.500.
Zansky, Zoltan, to Honeywell, Inc. Two-wire electronic dimming ballast for gaseous discharge lamps. 4,392,087, Cl. 315-219.000.
Zawadzki, Rainer K.: *See*—
Daniels, William A.; and Zawadzki, Rainer K., 4,391,992, Cl. 564-441.000.
Zdaniewski, Joseph J., to General Electric Company. Insulated coil assembly and method of making same. 4,392,070, Cl. 310-43.000.
Zeblisky, Rudolph J., to Kollmorgen Technologies Corporation. Passivation of metallic equipment surfaces in electroless copper deposition processes. 4,391,841, Cl. 427-12.000.
Zeiringer, Rudolf: *See*—
Krempl, Peter W.; Claassen, Peter; and Zeiringer, Rudolf, 4,391,147, Cl. 73-730.000.
Zenith Radio Corporation: *See*—
De Vries, Adrian J., 4,392,116, Cl. 333-194.000.
Libman, Philomena C., 4,392,077, Cl. 313-474.000.
Zentile, Antonio: *See*—
Masotti, Maurizio; Zentile, Antonio; and Cau, Pasqualino, 4,391,464, Cl. 293-120.000.
Zergenyi, Janos, to Ciba-Geigy Corporation. Aryloxymethyl oxazolinium derivatives. 4,391,980, Cl. 548-239.000.
Ziaylek, Theodore, Jr. Knock-down assembly for supporting oxygen tanks. 4,391,377, Cl. 211-71.000.
Ziegel, Douglas H., to RCA Corporation. Technique for optical alignment of a workpiece. 4,391,520, Cl. 356-154.000.
Zilske, Wolfgang; and Kuhn, Werner, to Degussa Aktiengesellschaft. Electrolytic bath and process for the deposition of gold alloy coatings. 4,391,679, Cl. 204-43.00G.
Ziv, Avraham: *See*—
Abad, Munir J.; Hollowell, William; Tanaka, Akira; and Ziv, Avraham, 4,391,420, Cl. 242-107.40A.
Zollco International, Inc.: *See*—
Gordon, Ellison T., 4,391,707, Cl. 210-242.300.
Zucker, Jerry: *See*—
Jo, Byeong H.; and Zucker, Jerry, 4,391,875, Cl. 428-378.000.
Zucker, Joseph; and Fitch, Arthur H., to GTE Automatic Electric Laboratories, Inc. Method of measuring splice loss in optical fibers. 4,391,517, Cl. 356-73.100.
Zummer, Anthony S., to Metaport Corporation. Releasable locking connector. 4,391,545, Cl. 403-189.000.
Zyo, Hiroshi: *See*—
Murakami, Naoyuki; and Zyo, Hiroshi, 4,391,346, Cl. 181-147.000.

# LIST OF REISSUE PATENTEES

TO WHOM

## PATENTS WERE ISSUED ON THE 5TH DAY OF JULY, 1983

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Beecham Group p.l.c.: *See*—
Dowrick, John S., Re. 31,301, Cl. 424-23.000.

Dawson, Ray H.: *See*—
Moore, John O.; and Dawson, Ray H., Re. 31,297, Cl. 239-121.000.

Dowrick, John S., to Beecham Group p.l.c. Intramammary compositions. Re. 31,301, Cl. 424-23.000.

Eaton Corporation: *See*—
Richards, Elmer A., Re. 31,296, Cl. 74-339.000.

Herbenar, Edward J., to TRW Inc. Spring shackle assembly. Re. 31,298, Cl. 267-54.00A.

Hoper, Jens: *See*—
Kessler, Manfred; and Hoper, Jens, Re. 31,299, Cl. 204-415.000.

Kessler, Manfred; and Hoper, Jens, to Max Planck Gesellschaft zur Foerderung der Wissenschaften. Ion-selective electrode device for polarographic measurement of oxygen. Re. 31,299, Cl. 204-415.000.

Max Planck Gesellschaft zur Foerderung der Wissenschaften: *See*—
Kessler, Manfred; and Hoper, Jens, Re. 31,299, Cl. 204-415.000.

Moore, John O.; and Dawson, Ray H., to Sprayrite Manufacturing Co. Full coverage recirculating sprayer. Re. 31,297, Cl. 239-121.000.

Richards, Elmer A., to Eaton Corporation. Transmission with resiliently loaded mainshaft gears. Re. 31,296, Cl. 74-339.000.

Sprayrite Manufacturing Co.: *See*—
Moore, John O.; and Dawson, Ray H., Re. 31,297, Cl. 239-121.000.

Stambler, Leon. Validation systems for credit card or the like. Re. 31,302, Cl. 340-825.340.

Stauffer Chemical Company: *See*—
Uhing, Eugene H.; and Toy, Arthur D. F., Re. 31,300, Cl. 260-543.00P.

Toy, Arthur D. F.: *See*—
Uhing, Eugene H.; and Toy, Arthur D. F., Re. 31,300, Cl. 260-543.00P.

TRW Inc.: *See*—
Herbenar, Edward J., Re. 31,298, Cl. 267-54.00A.

Uhing, Eugene H.; and Toy, Arthur D. F., to Stauffer Chemical Company. Process for preparing alkyl- or arylphosphonothioic dihalides. Re. 31,300, Cl. 260-543.00P.

# LIST OF REEXAMINATION PATENTEES

TO WHOM

## CERTIFICATES WERE ISSUED

Christini, Theodore Peter; Eustice, Albert Lawrence; and Graham, Arthur Hughes, to E. I. du Pont de Nemours and Company. Method for concomitant particulate diamond deposition in electroless plating, and the product thereof. B1 Re. 29,285, Cl. 428–544.

E. I. du Pont de Nemours and Company: *See*—
Christini, Theodore Peter; Eustice, Albert Lawrence; and Graham, Arthur Hughes. B1 Re. 29,285, Cl. 428–544.

Stein, Karl-Ulrich, to Siemens Aktiengesellschaft. Regenerating circuit in the form of a keyed flip-flop. B1 3,892,984, Cl. 307–530.

Siemens Aktiengesellschaft: *See*—
Stein, Karl-Ulrich. B1 3,892,984, Cl. 307–530.

Sternberg, Ben K.; Miller, Dale E.; and Bahjat, Dhari S., to Conoco, Inc. Electrode prospecting method providing calculable electromagnetic coupling for the indirect detection of hydrocarbon reservoirs. B1 4,295,096, Cl. 324–357.

Conoco, Inc.: *See*—
Sternberg, Ben K.; Miller, Dale E.; and Bahjat, Dhari S. B1 4,295,096, Cl. 324–357.

# LIST OF DESIGN PATENTEES

AB Bahco Verktyg: *See*—
Jansson, Conny, 269,590, Cl. D8-382.000.

Allan Air Products: *See*—
Ludwig, David, 269,588, Cl. D8-107.000.

Allgeyer, David F.; Johnson, Philip P.; and Gilliom, John W., to UMC Industries, Inc. Disposable pan for heating and serving food. 269,586, 7-5-83, Cl. D7-359.000.

Ammondson, Clayton J.: *See*—
Hartman, Robert G.; and Ammondson, Clayton J., 269,643, Cl. D34-7.000.

Anderson, Edward E. Surveyor's stake. 269,598, 7-5-83, Cl. D10-66.000.

Aspenwall, John E. Pistol rack. 269,572, 7-5-83, Cl. D6-188.000.

Barney, Michael, to Lever Brothers Company. Combined bottle and cap. 269,592, 7-5-83, Cl. D9-367.000.

Berkline Corporation, The: *See*—
Nelson, Deborah, 269,568, Cl. D6-63.000.

Bounds, William E. Condiment mill. 269,580, 7-5-83, Cl. D7-53.000.

Bounds, William E. Condiment mill. 269,581, 7-5-83, Cl. D7-53.000.

Bounds, William E. Condiment mill. 269,582, 7-5-83, Cl. D7-53.000.

Bounds, William E. Condiment mill. 269,583, 7-5-83, Cl. D7-53.000.

Bounds, William E. Condiment mill. 269,584, 7-5-83, Cl. D7-53.000.

Bowen, Michael W. Spool and spindle chair. 269,569, 7-5-83, Cl. D6-75.000.

Bruno, Robert H.: *See*—
MacGregor, Francis W.; and Bruno, Robert H., 269,636, Cl. D24-42.000.

Burroughs Wellcome Co.: *See*—
Hiscock, Robert J. H., 269,640, Cl. D28-2.000.

Carlomagno, Beryl E. Mold for confectionery or bakery product or the like. 269,579, 7-5-83, Cl. D7-44.000.

Challis, Brian. Handrail. 269,637, 7-5-83, Cl. D25-73.000.

CHAT Corporation: *See*—
Murphy, John M., 269,614, Cl. D14-93.000.

Church, Kenneth: *See*—
Strong, William A.; and Church, Kenneth, 269,604, Cl. D13-12.000.

Clairol Incorporated: *See*—
MacGregor, Francis W.; and Bruno, Robert H., 269,636, Cl. D24-42.000.

Continental Group, Inc., The: *See*—
Gruodis, Robert J.; Franz, William T.; and Hayes, Edward J., 269,593, Cl. D9-370.000.

Crum, James R. Piston working fixture. 269,616, 7-5-83, Cl. D15-140.000.

Dart Industries Inc.: *See*—
Phillips, Alan A., 269,585, Cl. D7-321.000.

D'Orleans, Henri, to L'Oreal. Bottle. 269,591, 7-5-83, Cl. D9-335.000.

Dougherty, Robert G. Rack for holding beverage order checks. 269,574, 7-5-83, Cl. D6-189.000.
Draddy, Roy C. Holder for a rule book and score card. 269,625, 7-5-83, Cl. D19-26.000.
Draddy, Roy C. Holder for a rule book and score card. 269,626, 7-5-83, Cl. D19-26.000.
Dulude, Charles R. Gun target. 269,631, 7-5-83, Cl. D22-15.000.
Eargle, William R., Jr.; and Westermann, Winfried N., to Westinghouse Electric Corp. Luminaire. 269,639, 7-5-83, Cl. D26-88.000.
Engelmann, Stefan. Spectacle holder. 269,619, 7-5-83, Cl. D16-129.000.
Fedora, Diana J. Novelty sculpture. 269,602, 7-5-83, Cl. D11-160.000.
Finnegan, John J., Jr.: *See*—
Provanzano, Salvatore R.; and Finnegan, John J., Jr., 269,605, Cl. D13-12.000.
Flintrol Incorporated: *See*—
Roberston, E. Wayde; and Watkins, Tommy R., 269,632, Cl. D22-19.000.
Fogarty, A. Edward; and Fogarty, Bonnie R. Combined pillow and finger puppets. 269,575, 7-5-83, Cl. D6-203.000.
Fogarty, Bonnie R.: *See*—
Fogarty, A. Edward; and Fogarty, Bonnie R., 269,575, Cl. D6-203.000.
Foggia, Donald A.; Muzumdar, Deepak R.; Klaiber, Gerhart F.; and Schneider, Rolf E., to Siemens Corporation. Large telephone keyset with display. 269,612, 7-5-83, Cl. D14-58.000.
Foggia, Donald A.; Muzumdar, Deepak R.; Klaiber, Gerhart F.; and Schneider, Rolf E., to Siemens Corporation. Telephone with function keys. 269,613, 7-5-83, Cl. D14-58.000.
Four R's Mfg. Corp.: *See*—
Perry, Richard W.; and Medeiros, Ronald J., 269,599, Cl. D10-87.000.
Fowkes, James C. Pouring spout attachment for a paint can or similar article. 269,596, 7-5-83, Cl. D9-447.000.
Franz, William T.: *See*—
Gruodis, Robert J.; Franz, William T.; and Hayes, Edward J., 269,593, Cl. D9-370.000.
Frye, David R.: *See*—
Frye, Elam C., Jr.; and Frye, David R., 269,638, Cl. D26-9.000.
Frye, Elam C., Jr.; and Frye, David R. Candle base. 269,638, 7-5-83, Cl. D26-9.000.
Geshwind, Herbert W. Combined Christmas tree stand and container therefor. 269,571, 7-5-83, Cl. D6-105.000.
Gilliom, John W.: *See*—
Allgeyer, David F.; Johnson, Philip P.; and Gilliom, John W., 269,586, Cl. D7-359.000.
Glassman, Jacob A. Surgical hood. 269,562, 7-5-83, Cl. D2-243.000.
Gold Eagle Co.: *See*—
Gurolnick, William R., 269,594, Cl. D9-389.000.
Goldstaub, Sylvia. Scrub brush. 269,565, 7-5-83, Cl. D4-10.000.
Gould Inc.: *See*—
Provanzano, Salvatore R.; and Finnegan, John J., Jr., 269,605, Cl. D13-12.000.
Gruodis, Robert J.; Franz, William T.; and Hayes, Edward J., to Continental Group, Inc., The. Container for liquids or the like. 269,593, 7-5-83, Cl. D9-370.000.
Gurolnick, William R., to Gold Eagle Co. Bottle or similar article. 269,594, 7-5-83, Cl. D9-389.000.
Hanslmair, Mark H. Pull tab opener. 269,587, 7-5-83, Cl. D8-40.000.
Hardy, Bruce N., to Silver Street, Inc. Drum rod attachable drum key holder. 269,622, 7-5-83, Cl. D17-22.000.
Harries, Alun, to Metal Box Limited. Lid for a container. 269,597, 7-5-83, Cl. D9-454.000.
Hartman, Robert G.; and Ammondson, Clayton J., to Zarn, Inc. Trash can and lid. 269,643, 7-5-83, Cl. D34-7.000.
Hayes, Edward J.: *See*—
Gruodis, Robert J.; Franz, William T.; and Hayes, Edward J., 269,593, Cl. D9-370.000.
Hennessy, Arnold: *See*—
Inch, John D.; and Hennessy, Arnold, 269,634, Cl. D23-65.000.
Hinshaw, Howard G.: *See*—
Jordan, William D.; and Hinshaw, Howard G., 269,606, Cl. D13-23.000.
Hiscock, Robert J. H., to Burroughs Wellcome Co. Medicinal tablet. 269,640, 7-5-83, Cl. D28-2.000.
Hitachi, Ltd.: *See*—
Nishiyama, Kazuhiko; and Itoh, Takao, 269,615, Cl. D14-96.000.
Inch, John D.; and Hennessy, Arnold, to International Water Saver Toilets, Inc. Water closet. 269,634, 7-5-83, Cl. D23-65.000.
Initial Plastics Limited: *See*—
Whitmarsh, Herbert F., 269,603, Cl. D12-205.000.
International Water Saver Toilets, Inc.: *See*—
Inch, John D.; and Hennessy, Arnold, 269,634, Cl. D23-65.000.
Inverness International Corporation: *See*—
Mann, Samuel J., 269,641, Cl. D28-10.000.
Itakura, Tsuyoshi: *See*—
Willinger, Allan H.; and Itakura, Tsuyoshi, 269,633, Cl. D23-22.000.
Itoh, Takao: *See*—
Nishiyama, Kazuhiko; and Itoh, Takao, 269,615, Cl. D14-96.000.
J. L. Prescott Co.: *See*—
Murray, Donald, 269,595, Cl. D9-413.000.
Jansson, Conny, to AB Bahco Verktyg. Snap lock fastener. 269,590, 7-5-83, Cl. D8-382.000.
Johnson, Philip P.: *See*—
Allgeyer, David F.; Johnson, Philip P.; and Gilliom, John W., 269,586, Cl. D7-359.000.
Jordan, William D.; and Hinshaw, Howard G., to Thermalloy Incorporated. Heat sink or similar article. 269,606, 7-5-83, Cl. D13-23.000.
Kaman, Charles H. Guitar bowl. 269,621, 7-5-83, Cl. D17-20.000.
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# LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 5TH DAY OF JULY, 1983

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Carr, Timothy W.; Needham, Charles D.; and Villetto, Robert T., Jr. Thin layer deposition process. T103,203, 7-5-83, Cl. 427-91.000.
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# CLASSIFICATION OF PATENTS

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NOTE.—First number, class; second number, subclass; third number, patent number

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1 GE 4,392,020
1 GQ 4,392,019
1 GS 4,392,016
1 HS 4,392,017
1 SM 4,392,018
1.5 R 4,392,021
2 DP 4,392,023
2 TV 4,392,022
99 R 4,392,024
111 R 4,392,025
175.3 R 4,392,026
181 W 4,392,027
185 4,392,028

**CLASS 180**

9.2 R 4,391,341
79 4,391,340
143 4,391,342
198 4,391,343
271 4,391,344

**CLASS 181**

147 4,391,346

**CLASS 182**

113 4,391,347
119 4,391,348
141 4,391,345

**CLASS 184**

6.26 4,391,349

**CLASS 188**

1.11 4,391,350
18 A 4,391,351
24.12 4,391,352
4,391,353
71.5 4,391,354
73.44 4,391,355

**CLASS 192**

84 C 4,391,356
94 4,391,357
130 4,391,358

**CLASS 193**

23 4,391,359

**CLASS 196**

412 4,391,360
735 4,391,361
855 4,391,362
865 4,391,363
4,391,364

**CLASS 200**

5 B 4,392,029
11 R 4,392,030
16 R 4,392,031
61.21 4,392,032
80 R 4,392,033
81.4 4,392,034
144 B 4,392,035
322 4,392,036
340 4,392,037

**CLASS 201**

41 4,391,674

**CLASS 202**

158 4,391,675
173 4,391,676

**CLASS 203**

28 4,391,677

**CLASS 204**

15 4,391,678
43 G 4,391,679
98 4,391,680
99 4,391,681
104 4,391,682
129.3 4,391,683
129.4 4,391,684
145 R 4,391,685
159.15 4,391,686
159.16 4,391,687
180 G 4,391,688
4,391,689
206 4,391,692
237 4,391,693
273 4,391,694
286 4,391,695
297 W 4,391,696
298 4,391,697
302 4,391,698
408 4,391,691
412 4,391,690
415 Re.31,299

**CLASS 206**

63.3 4,391,365
218 4,391,366
315 R 4,391,367
484 4,391,368
506 4,391,369
574 4,391,370
597 4,391,371

**CLASS 208**

8 LE 4,391,699
86 4,391,700
370 4,391,701

**CLASS 209**

10 4,391,702
523 4,391,372
526 4,391,373
540 4,391,374

**CLASS 210**

151 4,391,703
188 4,391,704
218 4,391,705
232 4,391,706
242.3 4,391,707
4,391,708
332 4,391,709
361 4,391,710
634 4,391,711
652 4,391,712
4,391,713
670 4,391,714
696 4,391,715
799 4,391,716

**CLASS 211**

13 4,391,375
60 SK 4,391,376
71 4,391,377
187 4,391,378

**CLASS 212**

4,391,379

**CLASS 213**

76 4,391,380

**CLASS 215**

1 C 4,391,381
213 4,391,382
256 4,391,383
307 4,392,055

**CLASS 219**

10.55 A 4,392,039
10.55 D 4,392,038
10.71 4,392,040
69 P 4,392,043
69 W 4,392,041
4,392,042
118 4,392,044
130.1 4,392,045
4,392,046
145.21 4,392,047
367 4,392,048
401 4,392,049
491 4,392,050
528 4,392,051
532 4,392,052

**CLASS 220**

307 4,391,385
343 4,391,386
359 4,391,384

**CLASS 221**

13 4,391,387
76 4,391,388

**CLASS 222**

135 4,391,389
136 4,391,390
478 4,391,391
598 4,391,392
642 4,391,393

**CLASS 223**

37 4,391,394
94 4,391,395

**CLASS 224**

205 4,391,396
265 4,391,397

**CLASS 226**

4 4,391,398
74 4,391,399
113 4,391,400

**CLASS 227**

19 4,391,401
121 4,391,402

**CLASS 228**

107 4,391,403

**CLASS 229**

31 R 4,391,405
62.5 4,391,404

**CLASS 235**

472 4,392,053

**CLASS 236**

36 4,391,913
47 4,391,406

**CLASS 237**

12.3 B 4,391,407

**CLASS 239**

121 Re.31,297
265.29 4,391,409
498 4,391,410

**CLASS 241**

1 4,391,411
36 4,391,412
99 4,391,413
213 4,391,414

**CLASS 242**

56.9 4,391,415
68.1 4,391,416
78.6 4,391,417
84.2 A 4,391,418
84.5 A 4,391,419
107.4 A 4,391,420
107.7 4,391,421
129.6 4,391,422

**CLASS 244**

161 4,391,423
207 4,391,424

**CLASS 246**

428 4,391,425

**CLASS 248**

49 4,391,426
176 4,391,427
546 4,391,428

**CLASS 249**

84 4,391,429

**CLASS 250**

307 4,392,054
339 4,392,056
385 4,392,057
492.2 4,392,058

**CLASS 251**

205 4,391,430

**CLASS 252**

8.55 D 4,391,719
8.6 4,391,717
8.7 4,391,718
49.6 4,391,720
51.5 A 4,391,721
73 4,391,722
90 4,391,723
4,391,724
4,391,725
99 4,391,726
4,391,727
182 4,391,728
182.1 4,391,729
299.1 4,391,730
299.62 4,391,731
356 4,391,732
378 R 4,391,733
4,391,734
413 4,391,735
429 B 4,391,736
4,391,737
4,391,738
455 Z 4,391,739
470 4,391,740
511 4,391,741
512 4,391,742
518 4,391,743
522 R 4,391,744
554 4,391,745

**CLASS 254**

29 A 4,391,431
365 4,391,432

**CLASS 260**

112 B 4,391,746
112.5 T 4,391,747
123.5 4,391,748
4,391,750
123.7 4,391,749
239.3 B 4,391,752
239.3 R 4,391,751
380 4,391,754
397.45 4,391,755
430 4,391,756
446 4,391,757
453 P 4,391,758
453.3 4,391,759
543 P Re.31,300
961 4,391,760
969 4,391,761

**CLASS 261**

121 R 4,391,762

**CLASS 264**

15 4,391,763
25 4,391,764
26 4,391,765
210.1 4,391,766
210.3 4,391,767
236 4,391,770
285 4,391,768
326 4,391,769

**CLASS 266**

77 4,391,433
196 4,391,434

**CLASS 267**

54 A Re.31,298
140.1 4,391,435
141.1 4,391,436

**CLASS 269**

254 CS 4,391,437
328 4,391,438

**CLASS 271**

90 4,391,439

**CLASS 272**

118 4,391,440
126 4,391,441
145 4,391,443

**CLASS 273**

94 4,391,444
142 E 4,391,442
158 4,391,445
201 4,391,446
238 4,391,447
243 4,391,448
260 4,391,449

**CLASS 277**

1 4,391,450

**CLASS 279**

2 A 4,391,451

**CLASS 280**

6.1 4,391,452
47.35 4,391,454
47.4 4,391,453
407 4,391,455
821 4,391,456

**CLASS 281**

31 4,391,457

**CLASS 285**

112 4,391,458
238 4,391,459

**CLASS 290**

38 D 4,392,059
53 4,392,060
4,392,061
54 4,392,062
4,392,063

**CLASS 292**

37 4,391,460
204 4,391,461
207 4,391,462
263 4,391,463

**CLASS 293**

120 4,391,464

**CLASS 296**

208 4,391,465

**CLASS 297**

452 4,391,466

**CLASS 299**

2 4,391,467
8 4,391,468
11 4,391,469
4,391,470
43 4,391,471
86 4,391,472

**CLASS 307**

530 B1 3,892,984
39 4,392,064
247 A 4,392,065
252 A 4,392,069
290 4,392,066
475 4,392,067
522 4,392,068

**CLASS 308**

6 C 4,391,473
207 R 4,391,476
221 4,391,477

**CLASS 310**

43 4,392,070
113 4,392,071
216 4,392,072
4,392,073
327 4,392,074

**CLASS 312**

320 4,391,478

**CLASS 313**

318 4,392,076
474 4,392,077
584 4,392,075

**CLASS 315**

4 4,392,078
5.39 4,392,079
5.41 4,392,080
46 4,392,081
55 4,392,082
85 4,392,083
169.4 4,392,084
173 4,392,085
174 4,392,086
219 4,392,087
241 R 4,392,088
313 4,392,089
411 4,392,090

**CLASS 318**

52 4,392,091
127 4,392,092
245 4,392,093
254 4,392,094
4,392,095
625 4,392,096
696 4,392,097
758 4,392,098
797 4,392,099
803 4,392,100

**CLASS 320**

20 4,392,101
48 4,392,102

**CLASS 323**

222 4,392,103

**CLASS 324**

357 B1 4,295,096
54 4,392,104
57 DE 4,392,105
72.5 4,392,106
73 R 4,392,107
95 4,392,108
350 4,392,109
453 4,392,110

**CLASS 328**

237 4,392,111

**CLASS 330**

252 4,392,112

**CLASS 331**

14 4,392,113

**CLASS 333**

28 T 4,392,114
141 4,392,115
194 4,392,116

**CLASS 335**

297 4,392,117

**CLASS 337**

154 4,392,118

**CLASS 339**

18 C 4,391,479
32 R 4,391,480
42 4,391,481
59 M 4,391,482
75 M 4,391,408
94 R 4,391,483
97 P 4,391,484
191 S 4,391,485

**CLASS 340**

38 L 4,392,119
310 A 4,392,121
323 R 4,392,122
347 AD 4,392,123
4,392,124
518 4,392,125
573 4,392,126
604 4,392,127
616 4,392,128
747 4,392,130
765 4,392,129
803 4,392,131
825.14 4,392,132
825.31 4,392,133
4,392,134
Re.31,302
825.44 4,392,135
825.56 4,392,136

**CLASS 343**

5 SC 4,392,137
103 4,392,138
705 4,392,139
765 4,392,140

**CLASS 346**

1.1 4,392,141
4,392,142
135.1 4,392,143
139 C 4,392,144
140 R 4,392,145
4,392,146
4,392,147
154 4,392,194

**CLASS 350**

96.14 4,391,486
96.20 4,391,487
257 4,391,488
341 4,391,491
349 4,391,489
351 4,391,492
356 4,391,490
422 4,391,493
442 4,391,494
452 4,391,495
519 4,391,496
523 4,391,497

**CLASS 351**

121 4,391,498

**CLASS 353**

122 4,391,499

**CLASS 354**

31 4,391,500
149 4,391,501

**CLASS 355**

3 DD 4,391,502
4,391,503
4,391,512
3 R 4,391,505
3 SH 4,391,504
4,391,510
8 4,391,506
14 CU 4,391,508
14 FU 4,391,509
14 R 4,391,507
40 4,391,511

**CLASS 356**

1 4,391,513
4,391,514
5 4,391,515
73.1 4,391,516
4,391,517
129 4,391,518
153 4,391,519
154 4,391,520
225 4,391,521
326 4,391,522
328 4,391,523
338 4,391,524
346 4,391,525
359 4,391,526
375 4,391,527

**CLASS 357**

5 4,392,148
49 4,392,149
51 4,392,150
72 4,392,151
80 4,392,152
82 4,392,153

**CLASS 358**

44 4,392,154
106 4,392,155

183 4,392,156
213 4,392,157
4,392,158
319 4,392,159
327 4,392,160

**CLASS 360**

10.3 4,392,161
4,392,162
76 4,392,163
77 4,392,164
105 4,392,165
113 4,392,166
120 4,392,167
129 4,392,168
130.33 4,392,169
133 4,392,170

**CLASS 361**

5 4,392,171
8 4,392,172
35 4,392,173
45 4,392,174
88 4,392,175
160 4,392,176
221 4,392,177
233 4,392,178
234 4,392,179
321 4,392,180
401 4,392,181

**CLASS 362**

5 4,392,182
11 4,392,183
101 4,392,184
105 4,392,185
116 4,392,186
233 4,392,187
269 4,392,188
281 4,392,190
306 4,392,189
392 4,392,191
418 4,392,192

**CLASS 363**

128 4,392,193

**CLASS 364**

167 4,392,195
200 4,392,196
4,392,197
4,392,198
4,392,199
4,392,200
4,392,201
426 4,392,202
434 4,392,203
478 4,392,204
518 4,392,205
900 4,392,206
4,392,207
4,392,208

**CLASS 365**

110 4,392,209
149 4,392,210
200 4,392,211
230 4,392,212

**CLASS 366**

15 4,391,528
266 4,391,529

**CLASS 367**

13 4,392,213
127 4,392,214
139 4,392,215

**CLASS 368**

63 4,391,530
71 4,392,216
188 4,392,217
239 4,391,531
250 4,391,532
281 4,391,533
294 4,391,534

**CLASS 369**

29 4,392,218
44 4,392,219

**CLASS 370**

18 4,392,220
54 4,392,221
60 4,392,222
63 4,392,223
67 4,392,224
75 4,392,225

**CLASS 371**

61 4,392,226

**CLASS 372**

46 4,392,227
4,392,228
94 4,392,229

**CLASS 373**

139 4,392,230

**CLASS 375**

80 4,392,231
86 4,392,232
93 4,392,233
118 4,392,234

**CLASS 376**

451 4,391,771

**CLASS 378**

10 4,392,235
51 4,392,237
045 4,392,236
144 4,392,238
146 4,392,239
207 4,392,240

**CLASS 382**

22 4,392,120

**CLASS 384**

152 4,391,474
226 4,391,475

**CLASS 400**

120 4,391,535
144.2 4,391,536
4,391,537
145.1 4,391,538
208 4,391,539
212 4,391,540
248 4,391,541
605 4,391,542

**CLASS 403**

24 4,391,543
155 4,391,544
189 4,391,545
4,391,546
341 4,391,547
348 4,391,548

**CLASS 404**

87 4,391,549

**CLASS 405**

7 4,391,550
43 4,391,551
59 4,391,552
141 4,391,553
224 4,391,554
264 4,391,555
4,391,556
287 4,391,557

**CLASS 408**

110 4,391,558

**CLASS 411**

45 4,391,559

**CLASS 414**

107 4,391,560
218 4,391,561
483 4,391,562
698 4,391,563

**CLASS 415**

126 4,391,564
189 4,391,565
209 4,391,566

**CLASS 416**

146 R 4,391,567

**CLASS 417**

237 4,391,568
302 4,391,569
353 4,391,570
403 4,391,571

**CLASS 418**

45 4,391,572
63 4,391,573
195 4,391,574

**CLASS 419**

23 4,391,772

**CLASS 422**

22 4,391,773
63 4,391,774
68 4,391,775
78 4,391,776
84 4,391,777
89 4,391,778
99 4,391,779
102 4,391,780
125 4,391,781

**CLASS 423**

7 4,391,782
315 4,391,783
320 4,391,784
339 4,391,785
442 4,391,786
447.3 4,391,787
447.6 4,391,788
457 4,391,789
574 R 4,391,790
4,391,791
617 4,391,792
648 R 4,391,793
650 4,391,794
659 4,391,880

**CLASS 424**

1 4,391,795
9 4,391,796
19 4,391,797
23 Re.31,301
52 4,391,798
132 4,391,799
177 4,391,800
4,391,801
236 4,391,802
239 4,391,803
245 4,391,804
246 4,391,805
248.4 4,391,806
4,391,807
250 4,391,808
251 4,391,809
4,391,810
263 4,391,811
267 4,391,812
269 4,391,813
272 4,391,814
274 4,391,815
4,391,816
4,391,817
277 4,391,818
278 4,391,819
282 4,391,820
283 4,391,821
4,391,822
306 4,391,823
315 4,391,824
319 4,391,825
324 4,391,826
331 4,391,827
340 4,391,828

**CLASS 425**

190 4,391,575
241 4,391,576
338 4,391,577
525 4,391,578
548 4,391,579

**CLASS 426**

28 4,391,829
43 4,391,830
93 4,391,831
275 4,391,832
523 4,391,833
565 4,391,834
573 4,391,835
578 4,391,836
583 4,391,837
606 4,391,838
626 4,391,839
641 4,391,840

**CLASS 427**

12 4,391,841
14.1 4,391,842
41 4,391,843
44 4,391,844
58 4,391,845
99 4,391,846
106 4,391,847
118 4,391,848
129 4,391,849
130 4,391,851
150 4,391,850
4,391,852
152 4,391,853
192 4,391,854
358 4,391,856
383.7 4,391,855
385.5 4,391,857
407.1 4,391,858
421 4,391,859
423 4,391,860

**CLASS 428**

544 B1 Re. 29,285
35 4,391,861
4,391,862
4,391,863
64 4,391,864
74 4,391,865
92 4,391,866
195 4,391,867
215 4,391,868
218 4,391,869
4,391,870
219 4,391,871
224 4,391,872
297 4,391,873
336 4,391,874
378 4,391,875
392 4,391,876
457 4,391,877
479.6 4,391,878
551 4,391,879

**CLASS 429**

96 4,391,882
97 4,391,883
111 4,391,881

**CLASS 430**

17 4,391,884
28 4,391,885
41 4,391,886
57 4,391,888
59 4,391,889
110 4,391,890
120 4,391,891
126 4,391,892
137 4,391,893
154 4,391,894
215 4,391,895
223 4,391,896
302 4,391,897
306 4,391,898
307 4,391,899
355 4,391,900
495 4,391,901
501 4,391,902
629 4,391,903

**CLASS 431**

1 4,391,580
160 4,391,581
266 4,391,582

**CLASS 432**

4 4,391,583
8 4,391,584
23 4,391,585
58 4,391,586
121 4,391,587

**CLASS 433**

33 4,391,588
63 4,391,589
90 4,391,590

**CLASS 434**

95 4,391,591

**CLASS 435**

7 4,391,904
14 4,391,905
4,391,906
42 4,391,887
115 4,391,907
144 4,391,908
178 4,391,909
232 4,391,910
239 4,391,911
241 4,391,912

**CLASS 448**

61 4,391,592
70 4,391,593

**CLASS 455**

26 4,392,241
33 4,392,242
74 4,392,243
79 4,392,244
115 4,392,245
116 4,392,252
158 4,392,246
161 4,392,247
4,392,248
164 4,392,249
165 4,392,253
173 4,392,254
327 4,392,250
4,392,251
328 4,392,255
354 4,392,256

**CLASS 464**

80 4,391,594

**CLASS 474**

33 4,391,595

**CLASS 493**

425 4,391,596

**CLASS 494**

20 4,391,597

**CLASS 501**

4 4,391,914
48 4,391,915
62 4,391,916
100 4,391,917
127 4,391,918

**CLASS 518**

725 4,391,919

**CLASS 521**

61 4,391,920
66 4,391,921
88 4,391,922
96 4,391,923
178 4,391,924

**CLASS 523**

130 4,391,925
132 4,391,926
161 4,391,927
201 4,391,928
218 4,391,929
219 4,391,930
318 4,391,931
337 4,391,932
454 4,391,933

**CLASS 524**

43 4,391,934
82 4,391,935
89 4,391,936
119 4,391,937
270 4,391,938
377 4,391,939
458 4,391,940
495 4,391,941
526 4,391,942
538 4,391,943
548 4,391,944
600 4,391,945
849 4,391,946

**CLASS 525**

11 4,391,947
57 4,391,948
99 4,391,949
132 4,391,950
166 4,391,951
333.7 4,391,952
351 4,391,953
425 4,391,956
439 4,391,954
454 4,391,957
462 4,391,955
504 4,391,958

**CLASS 526**

70 4,391,959
74 4,391,960
76 4,391,961
200 4,391,962

**CLASS 528**

37 4,391,963
74.5 4,391,964
112 4,391,965
176 4,391,966
189 4,391,967
321 4,391,968
389 4,391,969
408 4,391,970
481 4,391,971
499 4,391,972

**CLASS 536**

56 4,391,973

**CLASS 544**

90 4,391,975
030 4,391,974
211 4,391,976
277 4,391,977

**CLASS 546**

138 4,391,978

**CLASS 548**

194 4,391,979
239 4,391,980

**CLASS 549**

252 4,391,981
433 4,391,982
525 4,391,753

**CLASS 560**

124 4,391,983
236 4,391,984

**CLASS 562**

414 4,391,985
444 4,391,986
559 4,391,987
4,391,988
599 4,391,989
4,391,990

**CLASS 564**

412 4,391,991
441 4,391,992

**CLASS 568**

4 4,391,993
593 4,391,994
637 4,391,995
726 4,391,996
727 4,391,997
781 4,391,998
840 4,391,999

**CLASS 570**

104 4,392,000

**CLASS 585**

269 4,392,001
329 4,392,002
661 4,392,003
820 4,392,004

**CLASS 604**

65 4,391,598
110 4,391,272
4,391,273
118 4,391,599
153 4,391,600
190 4,391,274
266 4,391,276

## CLASSIFICATION OF DESIGNS

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D1— | 22 | 269,559 | | 189 | 269,574 | | 107 | 269,588 | D11— | 160 | 269,602 | D15— | 140 | 269,616 | | 150 | 269,630 |
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